Another new development using

B. F. Goodrich Chemical *raw materials*

Pressure booster needs exceptional seal— Hycar's the answer

THESE fluid pressure boosters develop output pressures up to 10,000 p.s.i.—must have an absolutely leak-proof seal. More than that, the seal material must not change in volume or deteriorate in hydraulic oil . . . be affected by normal operating temperature . . . or distort or cold flow under extreme pressure. On every count, the seal manufacturer found Hycar rubber fills the bill perfectly!

Meeting unusual requirements like these is an every-day job for Hycar. For this versatile material can be made resistant to heat and cold . . . abrasion . . . oil, grease, gas, many chemicals and more rugged service conditions.

Perhaps one of the many Hycar rubber compounds can help you improve or develop a product—or solve troublesome, costly problems. Write for helpful technical bulletins and advice. Please address Dept. HA-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U.S. Pat. Off.
American Rubber

This seal made for Miller Motor Co., Chicago, Ill., by Acadia Synthetic Products, Chicago. B. F. Goodrich Chemical Company supplies Hycar rubber only.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

Both Philblack* O *and* Philblack* A

Must pass their "screen tests" every day!

● These "stars of the screen" are tested by a water wash grit test over an 80 mesh per inch screen . . . every 2 hours every day! Philblack A and Philblack O pass these and other difficult tests with uniformly high standards. Stress-strain properties, Shore hardness, compression set, angle abrasion loss and flex life . . . every quality which makes Philblack compounds so outstanding is constantly checked by quality-control comparisons.

You can depend on both Philblack A and Philblack O for exceptionally high quality . . . uniformity . . . freedom from grit. Dense, firm Philblack O and Philblack A pellets handle efficiently in hopper cars and most bulk conveyor systems. Bagged Philblacks also available.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

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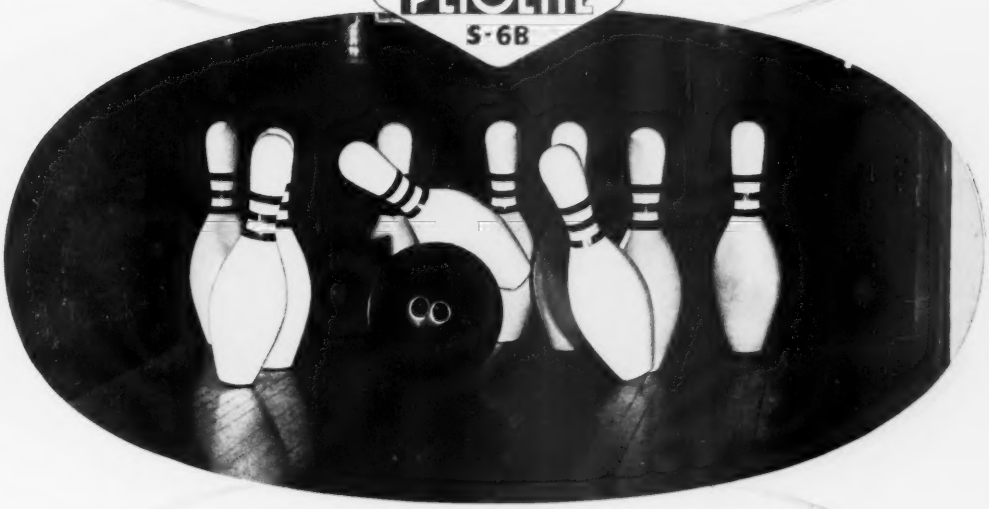
* A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

You get high strength and impact resistance in rubber reinforced with

PLIOLITE S-6B



These bowling pins are covered with rubber reinforced with PLIOLITE S-6B—Goodyear's resin for reinforcement that's "The Best Known—Known as the Best." As a result, the coating gains impact resistance and high strength—plus these other advantages:

Better resistance to abrasion
Improved resistance to flex crack growth
Higher hardness without brittleness

Rubber compounds reinforced with PLIOLITE S-6B are easier to process—thanks to the superior ease of dispersion of this resin. That means easier mixing, faster mixing, and increased production from your present equipment.

Wherever rubber products can be improved by reinforcement, it will pay you to turn to PLIOLITE S-6B. Ask a Goodyear Chemical Division Representative for details, or write:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—
T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

OAKES

CONTINUOUS, AUTOMATIC

FROTHING MACHINE

Partial List of Users

American Foam Rubber Corporation
Burlington, New Jersey

American Latex Products Corporation
Hawthorne, California

Amertex Manufacturing Corporation
Portsmouth, Virginia

Armour & Company, Chicago, Illinois

Armstrong Rubber Company
West Haven, Connecticut

Automotive Rubber & Carpet Industries, Inc.
Yonkers, New York

Crown Rubber Company, Fremont, Ohio

Dunlop Tire & Rubber Corporation
Buffalo, New York

Faultless Rubber Company, Ashland, Ohio

Firestone Rubber & Latex Products Company
Fall River, Massachusetts

Fremont Rubber Company, Fremont, Ohio

Globe Manufacturing Company
Fall River, Massachusetts

Goodyear Tire & Rubber Company, Akron, Ohio

Hewitt-Robins, Incorporated, Buffalo, New York

International Latex Corporation
Dover, Delaware

James Lees & Sons Company
Bridgeport, Pennsylvania

Toyad Corporation, Latrobe, Pennsylvania

United States Rubber Company
New York, New York

Most installations use more than one unit.

If you are considering foam latex—natural or synthetic

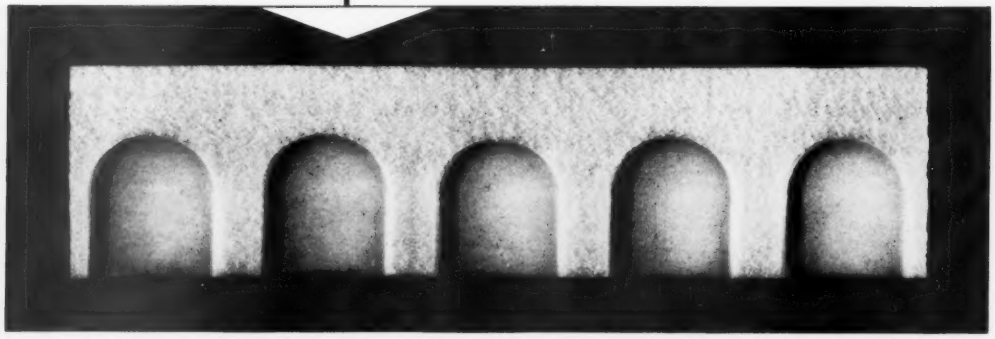
THE CONTINUOUS WAY IS THE PROFITABLE WAY!

Here is what the AMF-Oakes Continuous, Automatic Frothing Machine can do for you:

- Froth 200 to 2,000 pounds of foam latex per hour.
- Produce latex blow-ups of 6 to 18.
- Suitable for slabs, molds, rug backings, pillows, mattresses, furniture and automobile upholstery.
- Ideal for INJECTION MOLDING.

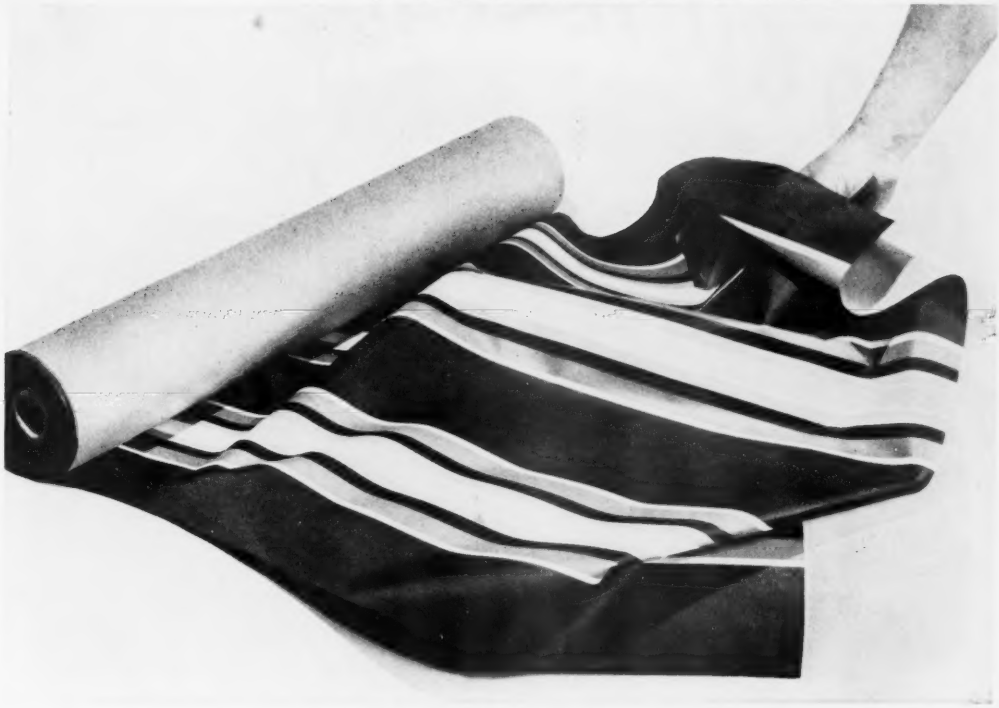
For Complete Information...

Write to Mr. T. R. Stevens,
Continuous Mixing Division
AMERICAN MACHINE & FOUNDRY COMPANY
511 Fifth Avenue, New York 17, N. Y.



Unretouched photograph of foam rubber frothed on the AMF-OAKES Continuous, Automatic Frothing Machine. (Latex blow-up of 14)

Soft hand and casual drape characterize this PLIOVIC *coated fabric manufactured by the Graniteville Manufacturing Company, Graniteville, S. C.*



BETTER TEXTILE COATINGS—

when your vinyl dispersions are made with PLIOVIC

TEXTILE manufacturers everywhere are relying on PLIOVIC – Goodyear's vinyl for use either in organosol, plastisol or latex dispersions. Such coatings when used on textile materials have these outstanding advantages:

1. Lower fusing temperatures 2. Less discoloration 3. Higher gloss 4. Greater clarity 5. Lower water sensitivity

PLIOVIC gives you production advantages, too. Fusing temperatures are from 25°-50° lower—protection against scorch and damage to base fabrics. You need less costly plasticizer with PLIOVIC—and can disperse the resin in less time using standard equipment.

If you have a textile coating problem—or want assistance in developing new finishes and products, it will pay you to investigate PLIOVIC. Ask a Goodyear Chemical Division representative for details, or write:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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NO GUTTER BALLS . . .

WITH TAYLOR IN CONTROL!

You don't catch Raybestos-Manhattan throwing balls away for substandard vulcanization, when they have a precision operation like this one, under Taylor Control.

In fact, they're scoring 300 time after time on bowling ball production, getting top efficiency from their equipment. Taylor controls run just about the whole vulcanizing process. On the platen press in the background and the horizontal vulcanizer in the foreground, all the operator does is load the equipment, press a button, and forget it until a signal tells him the cycle is complete. Taylor controls all vital times, temperatures and pressures within the narrow limits demanded for top quality bowling balls.

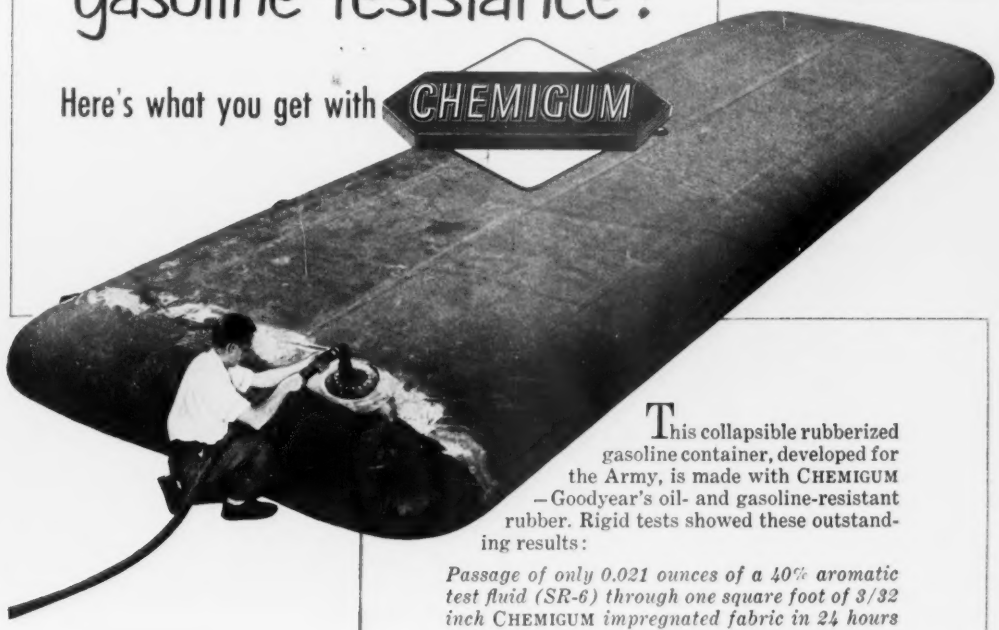
This is just one of dozens of ways Taylor can help any rubber goods manufacturer protect product quality, cut operating costs too. Ask your Taylor Field Engineer, or write: Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

Looking for gasoline resistance?

Here's what you get with CHEMIGUM



PORTABLE GASOLINE CONTAINER *developed for the Armed Forces, made with CHEMIGUM rubber for outstanding gasoline resistance.*

This collapsible rubberized gasoline container, developed for the Army, is made with CHEMIGUM—Goodyear's oil- and gasoline-resistant rubber. Rigid tests showed these outstanding results:

Passage of only 0.021 ounces of a 40% aromatic test fluid (SR-6) through one square foot of 3/32 inch CHEMIGUM *impregnated fabric in 24 hours at 75° F.*

Filled with 90-octane gasoline, this container showed no ill effects after 30 days.

Cold weather tests showed permissible use at −45° F.

Storage for over a year had no effect on the container.

Other advantages of correctly compounded and vulcanized CHEMIGUM rubbers include low compression set, water absorption and brittle point—and high tensile strength, elongation, modulus and crescent tear.

Try CHEMIGUM for your oil- or gasoline-resistant products—write today for full information as your first step. Address:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

In Rubber Compounding Materials Barrett is Basic

If you manufacture Vinyl products – make Barrett your source for plasticizers. As the largest producer of Phthalic Anhydride, Barrett is providing Phthalate ester plasticizers which have found widespread usefulness for the valuable qualities they supply to many processes.

Among these important plasticizers are:

ELASTEX® 10-P Plasticizer
Diisooctyl Phthalate (DIOP)
"ELASTEX" 20-P Plasticizer
Di-2-Ethylhexyl Phthalate (DOP)
"ELASTEX" DCHP Plasticizer
Dicyclohexyl Phthalate
"ELASTEX" 50-B® Plasticizer
Butyl Cyclohexyl Phthalate
DIBUTYL PHTHALATE

Thirty years ago Barrett introduced the first refined coal-tar product specifically designed for the rubber industry. Today, Barrett* rubber compounding materials have wide application with reclaim and synthetic, as well as natural rubber stocks. These versatile coal-tar chemicals aid in milling and processing and impart a variety of specific properties to the vulcanizate.

Rubber Compounding Materials produced by Barrett include:

Carbonex Rubber Compounding Hydrocarbon*
Bardol Rubber Compounding Oil*
"BARDOL" B Rubber Compounding Oil
Dispersing Oil 10
CUMAR Resin*
BRC 20 Rubber Compounding Pitch*
"BRC" 30 Rubber Compounding Pitch
BRF Rubber Softener*
BRT 3 Rubber Reclaiming Tar*
"BRT" 4 Rubber Reclaiming Tar
Resin "C" Resinous Compounding Material*

Barrett is Basic

Barrett*

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In Canada:
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5551 St. Hubert St., Montreal, Quebec

*Reg. U. S. Pat. Off.

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Big Difference
in INDUSTRIAL
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Give You Greater
Fabric Uniformity
Shown here is one of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here yarn tensile strength is being determined with 300-lb. vertical test.
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the star performer
for separating lightweight stocks

Since 1925, Linerette has provided a quick and easy way to separate stock without adhesion. This quality, specification sheet preserves the tackiness of the stock and contains no oil or wax which might migrate.

LINERETTE is furnished in any width up to and including 54″, in rolls of 9″, 11½″, 13″, and 15″ diameters; put up on 3″ i. d. cores. The yield is approximately six square yards to the pound. A 9″ roll contains 375 linear yards and a 15″ diameter about 1150 linear yards.

SAMPLES SENT ON REQUEST— *simply specify width desired.*

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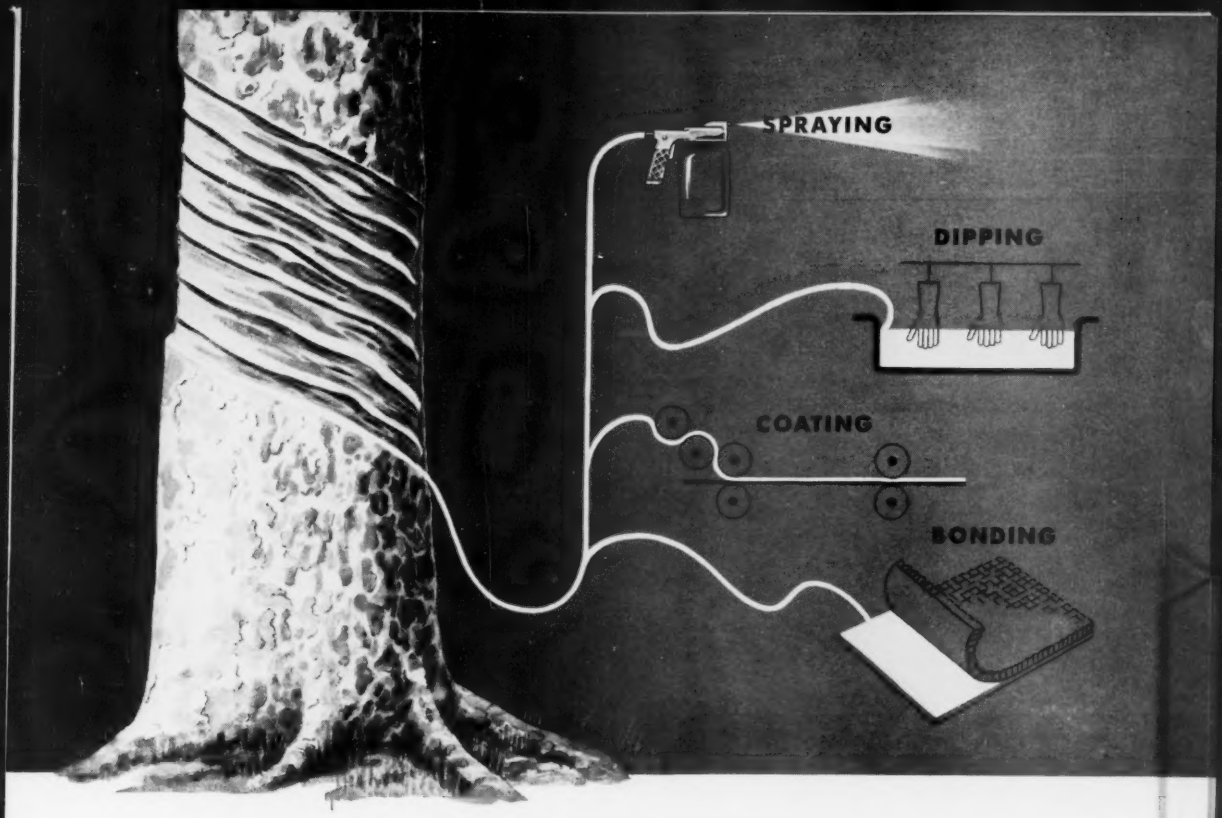

First and finest in natural latex

—*it's Naugatuck*

Ever since Naugatuck Chemical made liquid natural rubber latex a practical material of industry, over 31 years ago, it has been the leader in the supply of fine latex.

Naugatuck latices are produced from selected trees on the world's largest rubber plantations, and are carefully controlled every step of the way to bring you purity and uniformity that is unexcelled. See data at right.

In addition, Naugatuck offers a completely integrated customer service, and specially compounds to meet your most exacting requirements.

For a *reliable* supply of the *finest* latex, for spraying, coating, dipping, bonding, or saturating, get in touch with Naugatuck Chemical today.

PROPERTIES OF *Naugatuck Chemical LATEX*

TYPE LATEX Average Values	"Centrifuged" NC 401	"Centrifuged" NC 957	"Creamed" NC 356	"Creamed" NC 403
Total Dry Solids Concentration	62.2	63.3	67.5	52.8
Mechanical Stability—seconds	1250	1550	1100	1750
KOH Number	.44	.41	.46	.83
pH	10.5	10.5	10.4	10.4
Ammonia	.7	.66	.6	.85
Viscosity—centipoises	33	35	30	33.5
Yield-point—cg/cm^2	1.3	1.1	2.0	4.4
Copper (on film)	less than .001%	less than .001%	less than .001%	less than .001%
Manganese (on film)	less than .0005%	less than .0005%	less than .0005%	less than .0005%

Testing Procedures used are those of the Crude Rubber Committee, Division of Rubber Chemistry, American Chemical Society.

Naugatuck Chemical Division of **United States Rubber Company**

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Raw rubber gives little indication of having a glamorous future when you see it dockside.

Soon these bales will be transformed into gay, colorful swim suits, shower curtains, beach balls, floor tile, toys, and endless other products with the help of Titanox pigments. No other pigment can give such light or bright tints, or whites so white, in natural or synthetic rubber, as TiO_2.

There is a rutile or anatase Titanox pigment for any type of rubber compound. Just bring your problems to our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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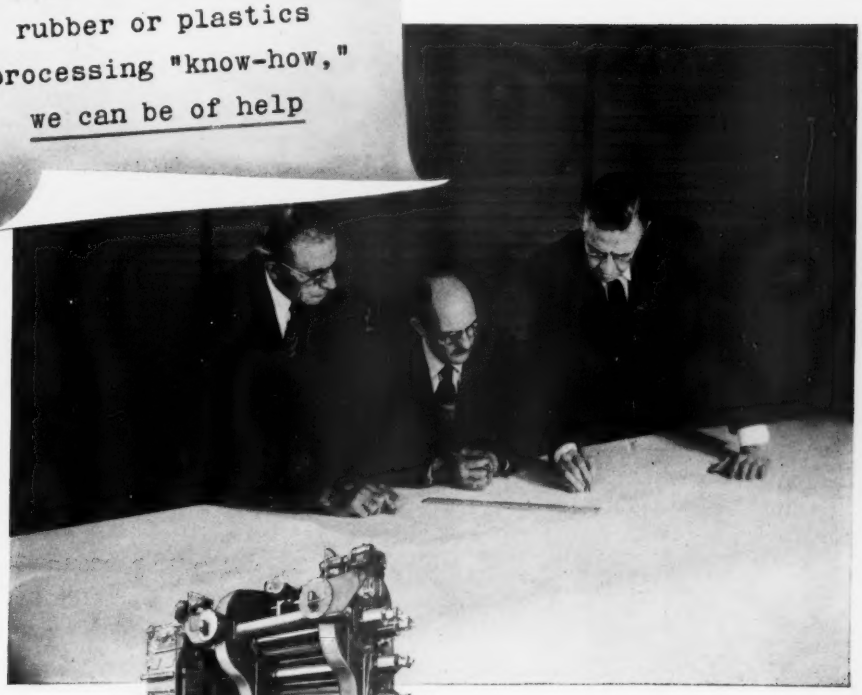
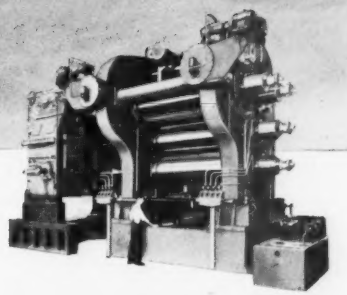
Subsidiary of NATIONAL LEAD COMPANY

Memo

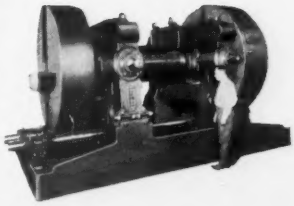
If your problem requires rubber or plastics processing "know-how," we can be of help





Our experienced and highly specialized engineering organization makes available to you the combined abilities of many minds for assistance in solving problems relating to machinery and processes for the manufacture of rubber or plastics products. Close cooperation with the rubber and plastics industries, and a consistently maintained research program, have enabled us to pioneer many revolutionary processes and improvements in basic manufacturing equipment.

When your plans call for the installation of single units or for the setting up of complete processing trains with all accessories, consult us. Designing processes and machinery to meet unusual product requirements has been our business for over 60 years.



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The reclaim that's *RIGHT* for both **BLACK** and **WHITE**

New R-400NS permits you to use the same low priced reclaim in carcass for either black or white sidewalls

Now, by the development of this remarkable new DIP-PROCESS reclaim, you can avoid confusion in your plant by using only ONE carcass compound for both black and white sidewalls.

The good working qualities and plasticity of R-400NS make it the perfect choice for carcass compounds and its economy makes it a MUST for profit-wise producers. R-400NS is in the same price range with ordinary reclaims, but delivers you the PLUS VALUE of excellent NON-STAINING characteristics. In other words, this new U. S. development has the happy faculty of being LOW enough in price for "blacks" and HIGH enough in quality for "whites". Drop us a line today for full details!

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

69 years serving the industry solely as reclaimers

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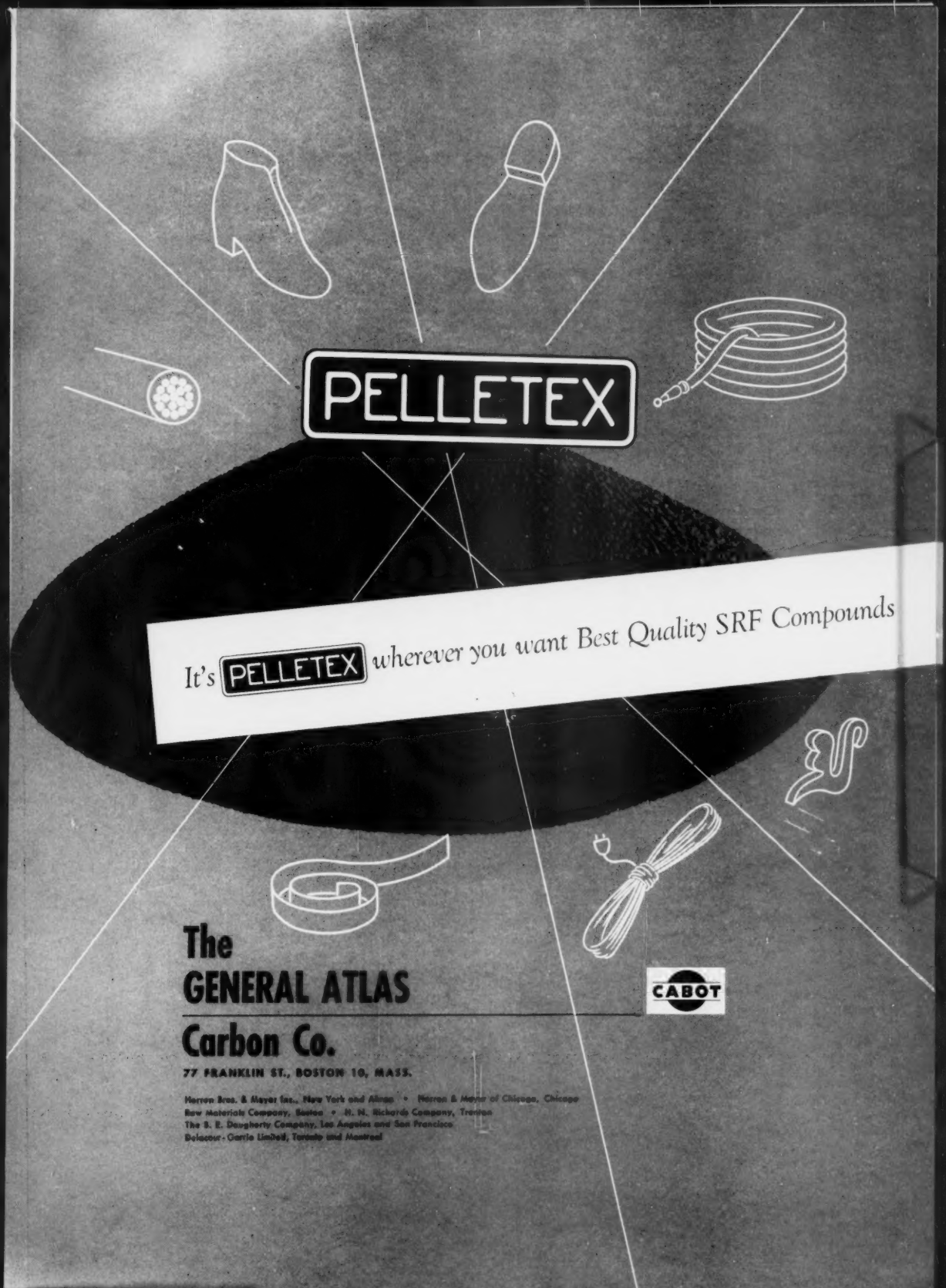
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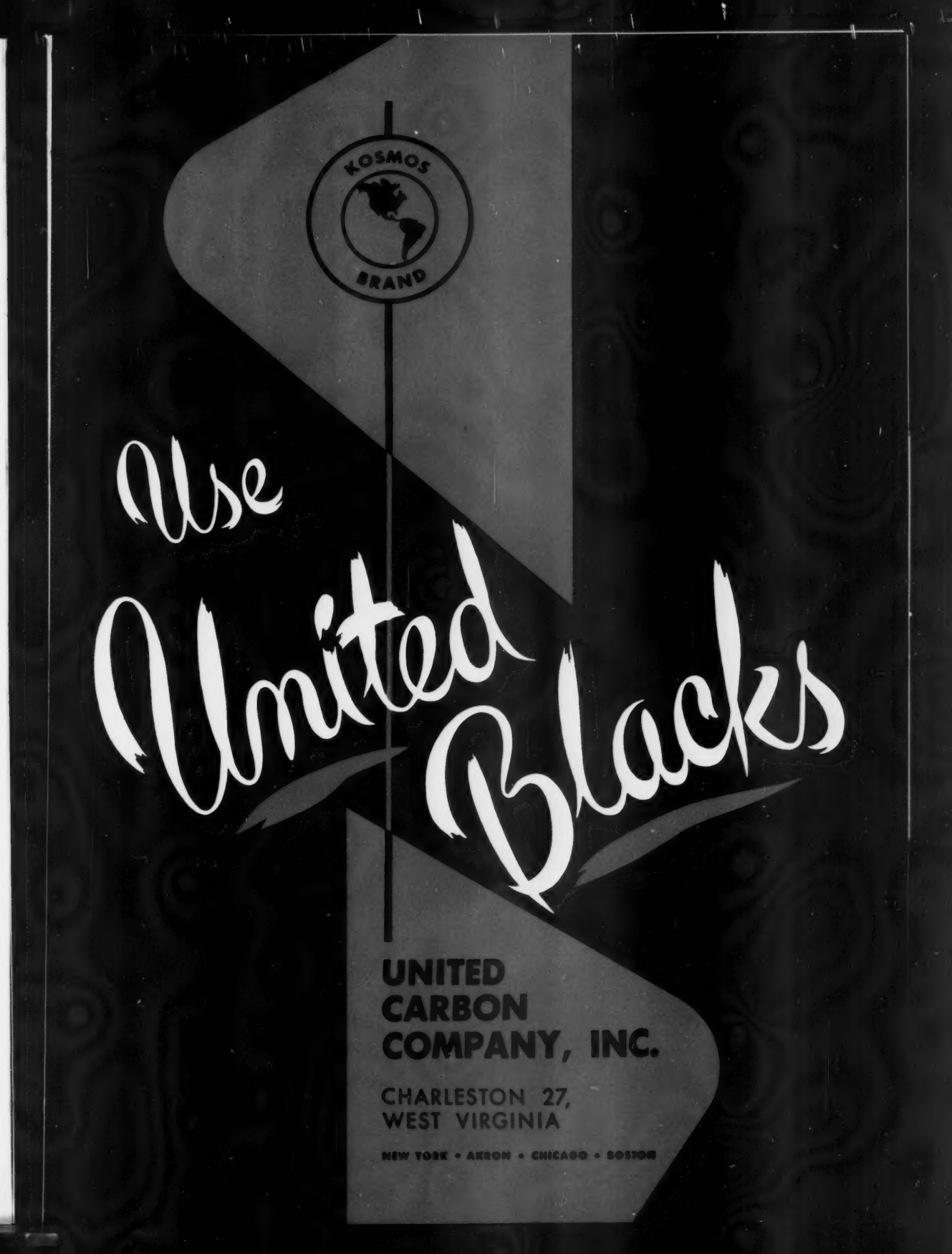
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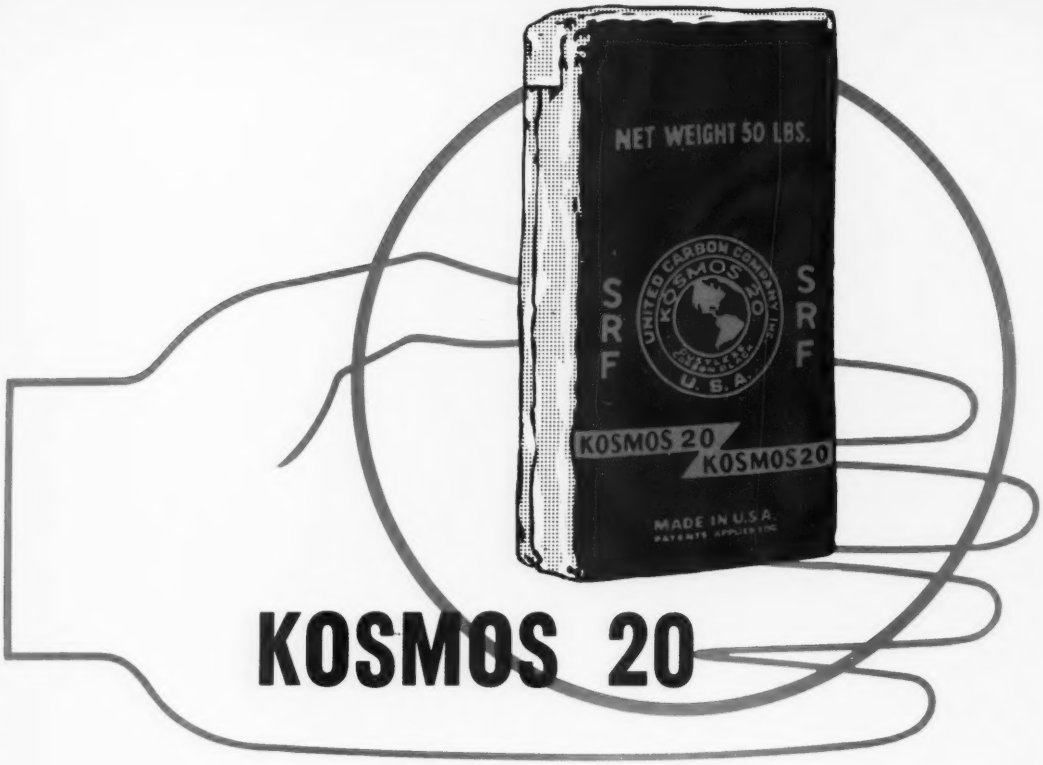

KOSMOS 20

at hand...

the qualities you need!

It is easier to stay in the lead when you standardize on United Blacks. For example, KOSMOS 20 . . . an SRF black with extensive applications in the rubber industry. It is a black of dependable uniformity, outstanding for ease of processing, good plasticity and fast rate of cure. For maximum efficiency use KOSMOS 20.

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For natural rubber compounds

For light or dark rubber—if you want soft, flexible natural compounds with maximum tear resistance—call for Multifex® MM. It gives you all these qualities at low cost; loadings can reach ratios of 100 parts Multifex MM to 100 parts natural rubber. Multifex MM disperses easily, too, especially when mixed as a concentrated master batch, then cut back to desired loading.

Write for our technical bulletin, "Precipitated Calcium Carbonates in Rubber and Polyvinyl Compounds".

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DIAMOND ALKALI COMPANY...CLEVELAND 14, OHIO

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SPEED UP PRODUCTION

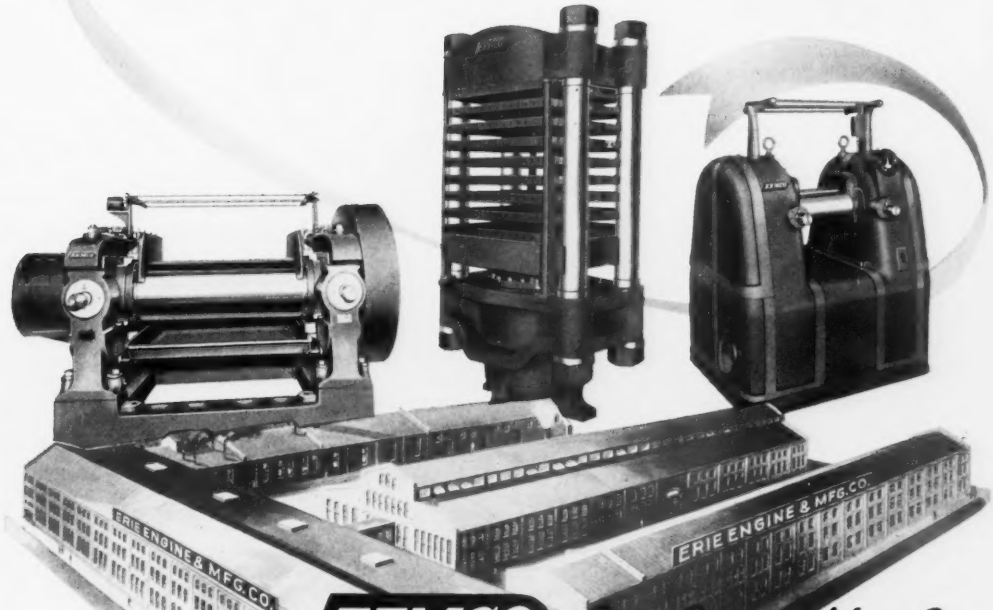
with EEMCO

MILLS ★ PRESSES ★ REFINERS ★ CRACKERS ★ WASHERS

RUBBER and PLASTICS processing machines manufactured by EEMCO are built for *long life* and *heavy duty* by expert craftsmen with many years of experience. Because of their extra sturdy construction they assure *maximum production.* You'll find EEMCO rubber and plastics processing machines in use throughout the world—giving their owners uninterrupted and trouble-free service. Learn more about the *fast delivery* schedules, the *low upkeep,* greater profits and *speedier production* made possible by EEMCO.

Standard machines are available or custom built to your order.

Known for Quality throughout the World



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Erie Engine & Mfg. Co.

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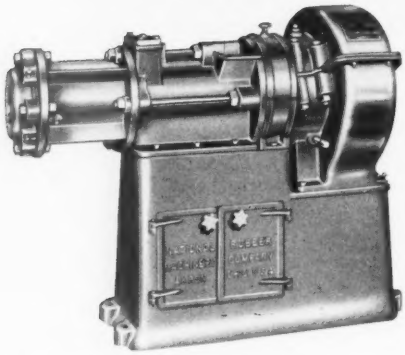
PLASTICS MACHINERY DIVISION

Write for prices, delivery schedules and bulletins on machines in which you're interested.

NRM MIL-X-TRUDER

MIXES AS IT EXTRUDES
ELIMINATES
"WARM-UP" MILLING



NRM's 3½" Steam Heated MIL-X-TRUDER and a diagrammatic sketch of its internal recirculation of stock.

The MIL-X-TRUDER is an exclusive NRM development. It combines intensive mixing with precision extrusion. A specially designed feed screw and fluted cylinder create an internal recirculation of the compound being extruded. The shearing and working that occur insure thorough mixing and plastication.

The advantages of the MIL-X-TRUDER have been fully proved in production. Replacing a conventional machine, the MIL-X-TRUDER takes room temperature stock, eliminates "warm-up" milling. It provides an even feed and smooth extrusions. Its thorough mixing permits the reprocessing of scrap without trouble. The dies you are now using on a standard machine can be used on a MIL-X-TRUDER.

Let NRM's engineeers show you how to save time, space, and equipment with a MIL-X-TRUDER. Write, today!

NRM Newsnotes

NRM BUILDS NEW EASTERN OFFICE

Construction is underway on a new, modern building to house the administrative and engineering personnel of NRM's Clifton plant. It will also serve as headquarters for the Eastern sales division. The new building will be located at 384 Getty Ave., Clifton, N. J. It should be ready for occupancy about September 1, 1952.

NEW BOOKLET DESCRIBES MAKING OF FEED SCREWS

"19 STEPS TO BETTER EXTRUDING AND STRAINING" is a new 16-page booklet that graphically describes the design and manufacture of high quality extruder and strainer feed screws. Just off the press, it will provide interesting and worthwhile reading. Write for your copy, today! It's yours for the asking.

"SPEC" SHEET ON NEW 2½" EXTRUDER NOW AVAILABLE

NRM's new 2½" Heavy Duty Model 50 Rubber Extruder is fully described in a recently printed specifications sheet. The complete information offered includes a description of parts, dimensional drawings, sketches, capacities, etc. Learn how this new unit can give you years of accurate, trouble-free rubber extrusions. Get your copy, today!

2059

NATIONAL RUBBER MACHINERY COMPANY

NRM

Creative Engineering

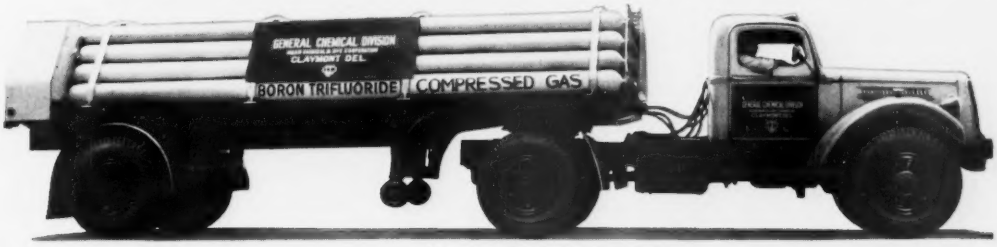
General Offices & Engineering Laboratories: Akron 8, Ohio
East: 384 Getty Ave., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Cal.
Export: Gillespie & Company, 96 Wall Street, New York 5, New York

NOW, GENERAL CHEMICAL BRINGS INDUSTRY THIS

Versatile Catalyst

BORON TRIFLUORIDE

in Many Forms...in Tonnage Quantities*



A LABORATORY CURIOSITY less than a decade ago, now an industrial chemical of tremendous significance as a catalyst—that is the story of Boron Trifluoride as developed by General Chemical's fluorine research program.

Today, the catalytic properties of Boron Trifluoride . . . both as a compressed gas and in its various complexes . . . are being utilized in many major industrial fields. These include petroleum, synthetic rubber, resins, solvents, plastics, dyestuffs, metallurgy, etc. With it, many hitherto impossible operating problems involving organic reactions are being solved.

To meet every processing need, General Chemical produces Boron Trifluoride both as a gas and in a wide range of complexes. Recently, General began regularly-scheduled tonnage shipments of the compressed gas by tank truck, marking another milestone in the expanding use of this new industrial chemical.

Listed at the right are many of the reactions in which General's BF_3 is now being utilized. If your operations involve these or similar techniques, you may find it advantageous to investigate Boron Trifluoride and its complexes.

For further information, for experimental samples of any of the products listed, or for confidential discussion of your particular needs, consult the nearest General Chemical office serving you.

Present or Potential Uses of BF_3 as a Catalyst

POLYMERIZATION

ALKYLATION

ESTERIFICATION

ISOMERIZATION

CYCLIZATION

ACYLATION

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

GENERAL CHEMICAL'S BF_3 PRODUCTS

Commercially Available in Tonnage Quantities

Compressed Gas	
Phenol Complex	**(Liquid)**
Etherate Complex	**(Liquid)**

Available in Limited Commercial Quantities

Ammonia Complex	**(Solid)**
Diacetic Acid Complex	**(Liquid)**
Di-normal Butyl Ether Complex	**(Liquid)**
Dihydrate	**(Liquid)**
Piperidine Complex	**(Solid)**

Other Complexes

In addition, extensive research and production facilities place General Chemical in a preferred position to work with you in development of other BF_3 complexes to meet individual specifications.

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Offices in Principal Cities from Coast to Coast

Now you can buy precision molding and high surface finish by the drum! And what's more, those drums of Dow Corning Silicone mold lubricants also reduce scrap to the vanishing point—cut your mold maintenance costs by as much as 80%. Clean molds stay cleaner longer and you get easier release of tires and parts with uniformly sharp detail and a high surface finish, free from blemishes, inside and out.

That's why pressmen, production managers, quality control and sales departments all call for Dow Corning Silicone release agents; Emulsions for molds and curing bags; Mold Release Fluid in a solvent solution for green carcasses and for bead and parting line release.

For more information call our nearest branch office or write for data sheet M-19

For Better Quality **SPECIFY DOW CORNING SILICONE MOLD RELEASE AGENTS**

Dow Corning Silicones Mean Business!

DOW CORNING CORPORATION

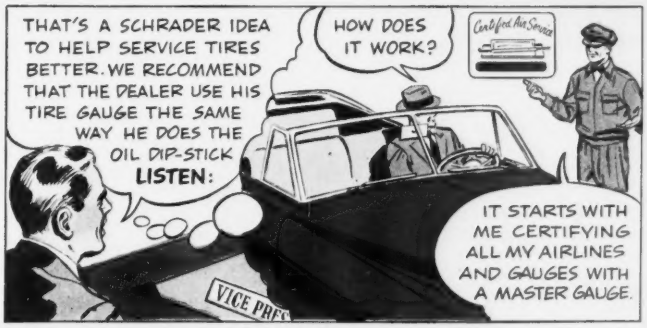
DOW CORNING SILICONES

MIDLAND MICHIGAN

ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES • NEW YORK • WASHINGTON, D. C.

IN CANADA: FIBERGLAS CANADA LTD., TORONTO • GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON

Schrader Contributions to the Tire Industry


THAT'S A SCHRADER IDEA TO HELP SERVICE TIRES BETTER. WE RECOMMEND THAT THE DEALER USE HIS TIRE GAUGE THE SAME WAY HE DOES THE OIL DIP-STICK LISTEN:
HOW DOES IT WORK?
Certified Air Service
IT STARTS WITH ME CERTIFYING ALL MY AIRLINES AND GAUGES WITH A MASTER GAUGE.
VICE PRES

...I INFLATE TO RECOMMENDED PRESSURE APPLYING THE HEAT BUILD-UP FORMULA FOR SAFEST DRIVING, RIDING COMFORT AND STEERING EASE. THEN I SEAL IN THE AIR WITH THIS VALVE CAP.
IT SURE SOUNDS GOOD TO ME.
VICE PRESIDENT

And it sounds good to the many dealers who are now using Certified Air Service as part of their regular procedures . . . and it helps them service and sell tires. This is but one example of the service behind Schrader Tire Valve Equipment that extends right down to the car owner.

Have you seen a copy of the Certified Air Service procedure manual? Write for Manual D-200.

A. SCHRADER'S SON, 470 VANDERBILT AVE., BROOKLYN 17, N. Y.
Division of Scovill Manufacturing Company, Incorporated

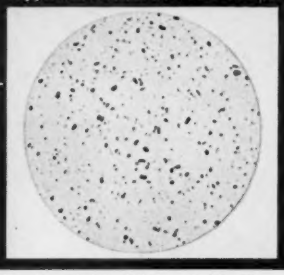
Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

for finest quality

RUBBER AND LATEX PRODUCTS

Magnification 1500X
Approx. Scale: 1 Micron = 1/16 in.



ST. JOE BLACK LABEL #20

A fast curing type of very fine particle size, giving maximum reinforcement and activation in rubber.

Representative Chemical Tests

ZnO	99.20%
Pb	.03
Cd	.01
Mn	.003
Cu	.002
Acidity as SO_3	.03
Total S as SO_3	.05
H_2O soluble salts	.15
Insoluble in HCl	.15
Loss at 110° C.	.30

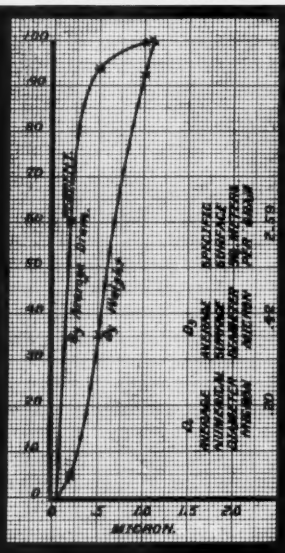
Representative Physical Tests

Particle size

Average numerical diameter D_1 — microns	.20
Average surface diameter D_s — microns	.42
Specific surface — Sq.M./gram	2.59
Percent fines under .50 micron	35.0
Specific gravity	5.65
Apparent density — lb./cu. ft.	22.

Cleanliness

Percent thru 325 mesh screen	99.97

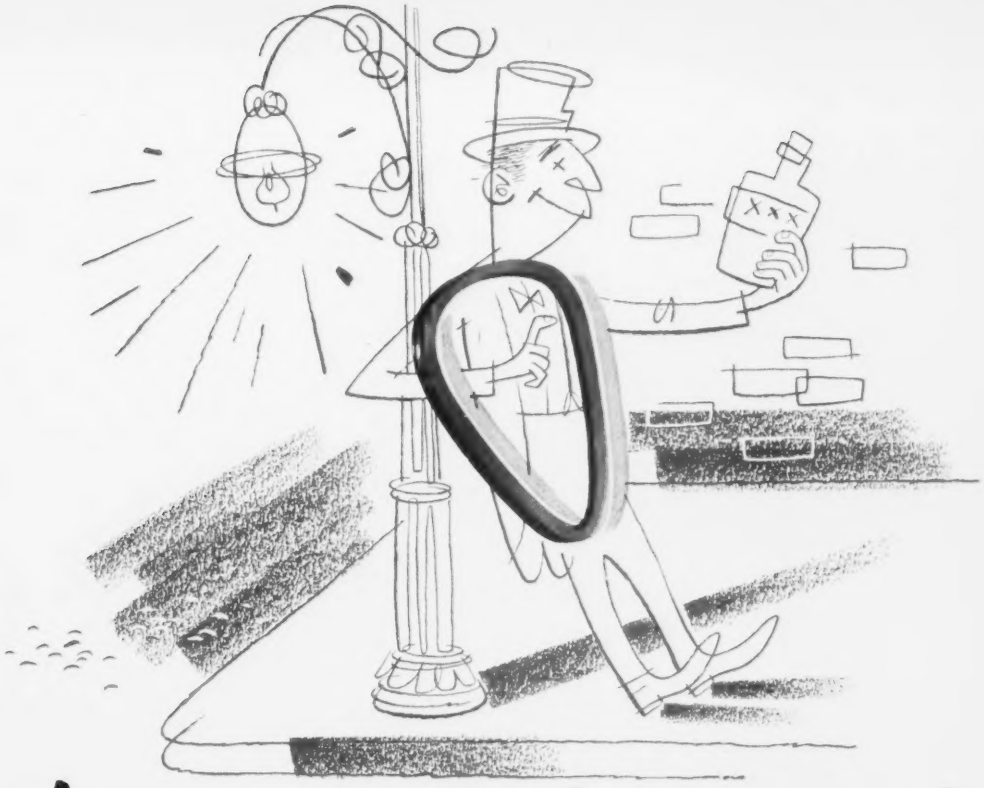


Particle Size Distribution

ST. JOSEPH LEAD COMPANY
250 PARK AVE.
NEW YORK CITY 17
Plant & Laboratory: Monaca (Josephtown) Pa.

For the finest quality products made from rubber and latex we recommend St. Joe Black Label #20 lead-free Zinc Oxide. Its uniform, extremely fine particle size develops maximum effectiveness of activation and reinforcement because of the greater particle surface area made available for reaction. Its uniform low acidity aids materially in the production of fast curing compounds.

Complete physical and chemical properties of St. Joe rubber grade zinc oxides are described in our new technical manual, ST. JOE ZINC OXIDES. Write for your free copy—on your company letterhead please.



this rubber got tight in a hurry!

	TUEX per 100 RHC	MBT per 100 RHC	Sulfur per 100 RHC	PSI Tensile	PSI Modulus 400%	% Elongation
Natural Rubber (black)	.23	—	3.0	4430	1650	730
Natural Rubber (non-black)	.40	1.5	1.0	2050	1200	520
GR-S (non-black)	.62	—	2.5	1270	570	700
Butyl Rubber	1.00	—	2.0	2200	550	830
PARACRIL	3.00	—	0.0	2750	2700	420

with Tuex—the accelerator that gives a really *fast, tight* cure for all natural and synthetic rubbers. Used as a primary accelerator with or without sulfur, or as an activator for other accelerators, quick-acting Tuex makes possible high modulus and very good tensile strength.

Tuex (tetramethylthiuram disulfide) is available as a powder, or in free-flowing, dustless, fast-dispersing Naugets. Chart shows typical results of Tuex cures. For further information, write to address at left.

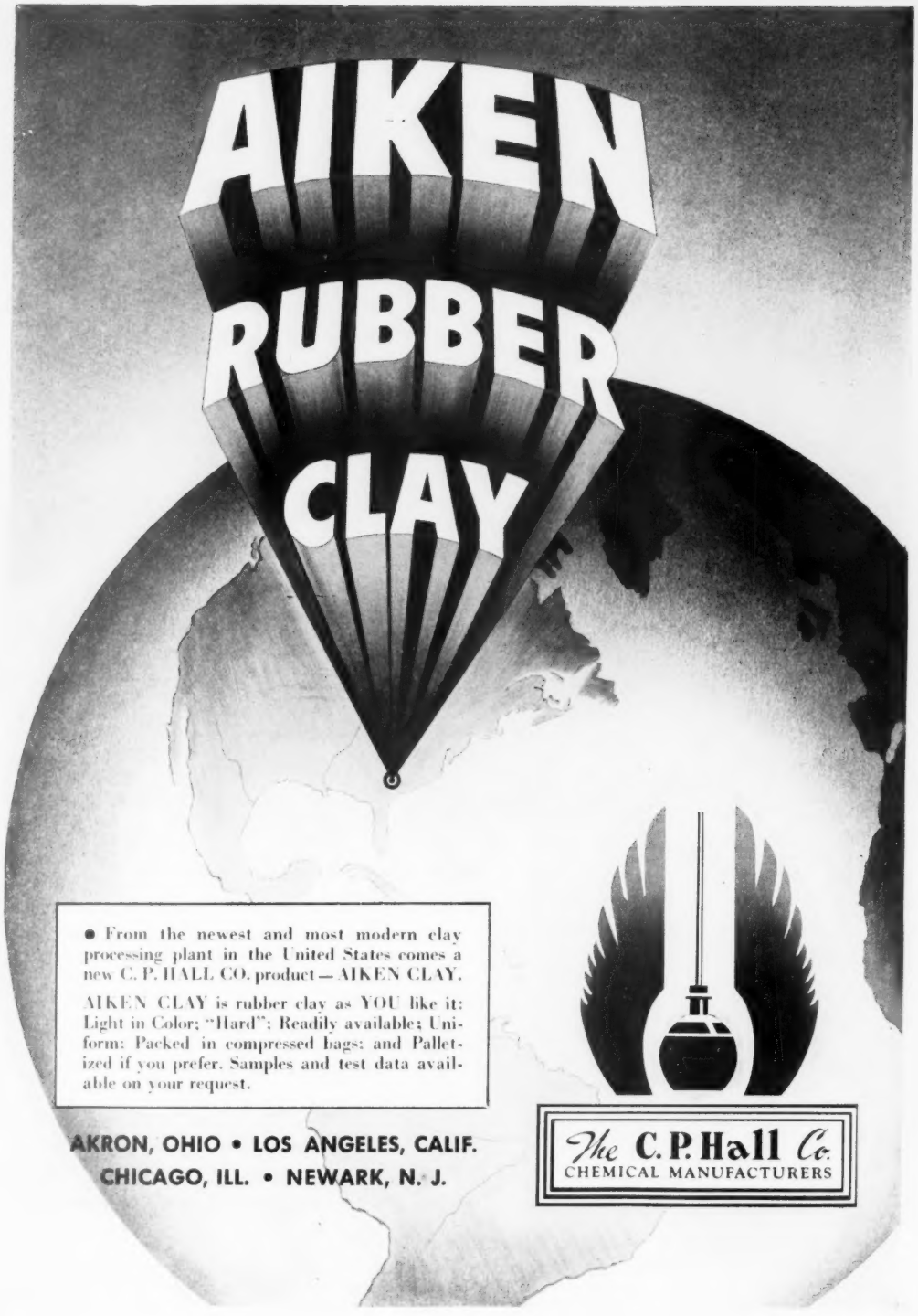
Naugatuck Chemical

Division of United States Rubber Company

107 ELM ST., NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices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CLAY
• From the newest and most modern clay processing plant in the United States comes a new C. P. HALL CO. product — AIKEN CLAY.
AIKEN CLAY is rubber clay as YOU like it: Light in Color; "Hard"; Readily available; Uniform: Packed in compressed bags; and Palletized if you prefer. Samples and test data available on your request.
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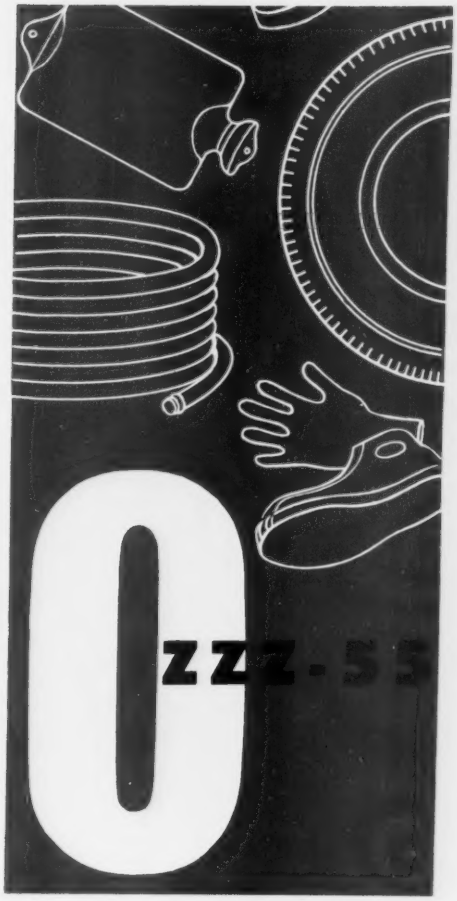
The C. P. Hall Co.
CHEMICAL MANUFACTURERS

AZO-ZZZ-55

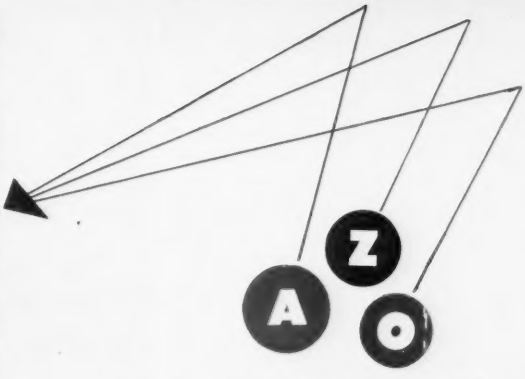
zinc oxide

An easy processing zinc oxide. Uniform particle size and absence of extreme "fines" assures good dispersion in rubber.



AZO

zinc oxides for every rubber need



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Distributors For

AMERICAN ZINC, LEAD & SMELTING CO.

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ST. LOUIS, MO. NEW YORK

MASTER MIXER...

EASY PROCESSING

Marbon "8000"

Can be added directly to your rubber compounds!

- Eliminates prior Masterbatching.
- Combines higher hardness plus higher modulus.
- Gives greater tear and abrasion resistance.
- Provides easier moldability. Excellent appearance.
- Blends with Natural, Synthetic and Reclaim rubbers.

ORDER NOW! STOCK READILY AVAILABLE!

Marbon

MARBON CORP.

GARY, INDIANA

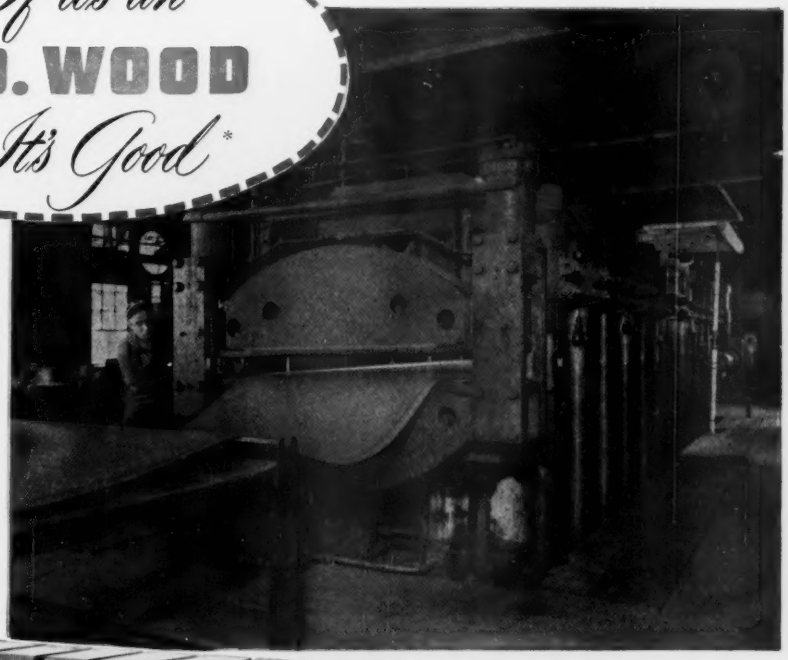
SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

If it's an

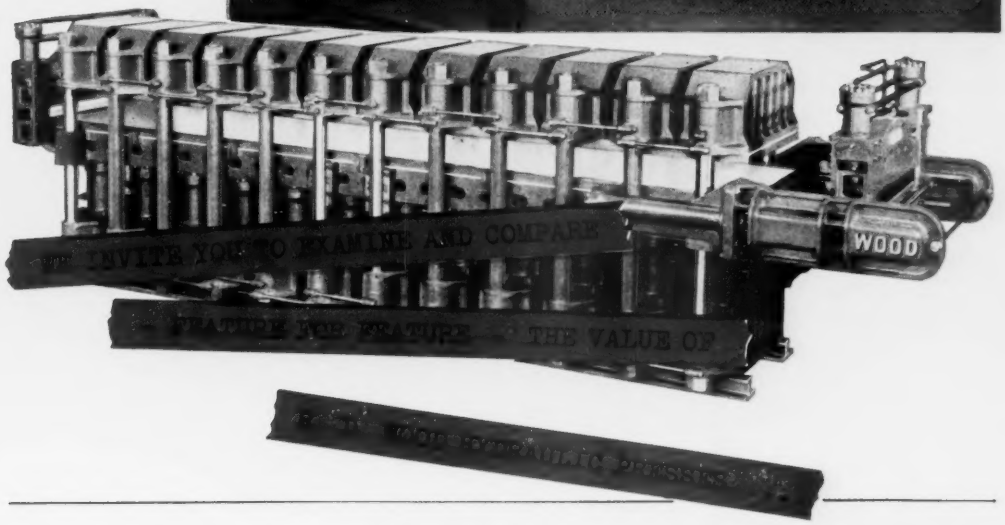
R.D. WOOD

*...It's Good**



3,180-ton single opening hydraulic belt press used for vulcanizing rubber belting. Twenty-four cylinders are arranged in pairs which can be cut out at any time, or can be removed from the press without dismantling any other part.

Hydraulic stretcher and clamping units are mounted at the ends of the moving platen which measures 63¼" x 30" x 3¾".



HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE
ACCUMULATORS
ALLEVIATORS
INTENSIFIERS

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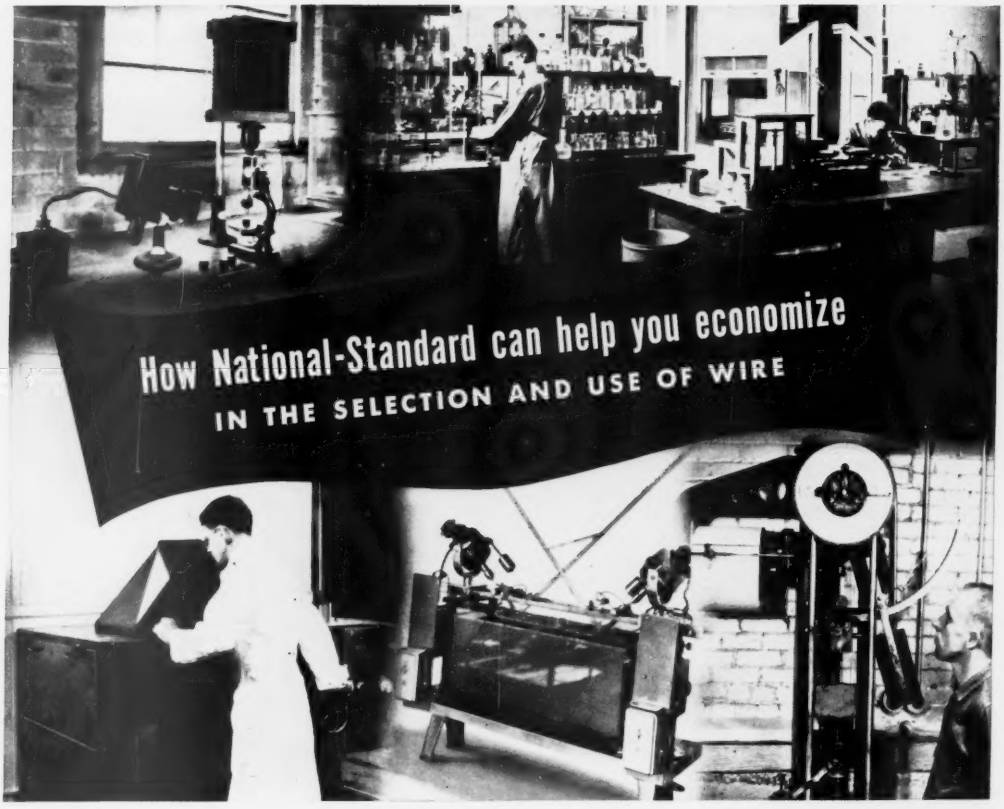
Established 1803

RDW WOOD

*FIND OUT WHY. SEND FOR YOUR FREE COPY OF OUR NEW PHOTOGRAPHIC BOOK OF PLANT FACILITIES.



A standing offer of service

THERE may be ways in which you can save a "penny" here and there in producing your tire beads, hose, belts or other wire-in-rubber products. National-Standard engineers, who have contributed cost-saving suggestions in many a rubber plant, always welcome the chance to help you find out.

For here at National-Standard we've spent a lifetime studying and improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, adhesion and innumerable details you might never bother with.

So even if you don't have a serious "problem", there's still a chance we can come up with a suggestion or two that will save you money or improve your product. Just say when.

NATIONAL-STANDARD Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL.. *Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD.. *Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE.. *Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY.. *Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS.. *Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

a pair of aces....

CALCO NOBS* NO. 1...
ANTIOXIDANT 2246*

An outstanding delayed-action accelerator, CALCO NOBS No. 1 is ideal for reinforcing furnace blacks in tire compounding. ANTIOXIDANT 2246 is the most active non-staining, non-discoloring antioxidant ever developed.

*Trademark

Both of these products give outstanding results in natural rubber or GR-S stocks, and CALCO NOBS No. 1 aids in processing reclaimed rubber as well. Specify them for superior processing results!

Calco®

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION

INTERMEDIATES • RUBBER CHEMICALS DEPARTMENT

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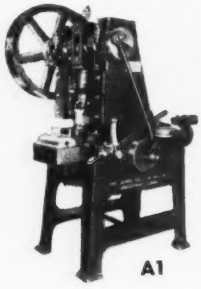
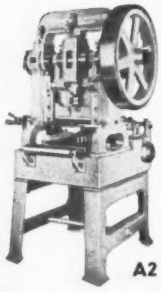
Men who Know PRODUCTION MACHINES Choose

the James COULTER Machine Co.
BRIDGEPORT, CONN.

For MORE than Half a Century the name COULTER has meant MORE in higher quality cuttings . . . MORE IN GREATER PRODUCTION.

MODEL A-1
Cutting Heels at high speed production or short runs.

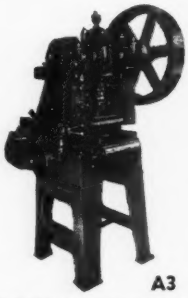

A1


A2

MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.

MODEL A-2s
(Not illustrated)
Cutting across grain of stock.


A3

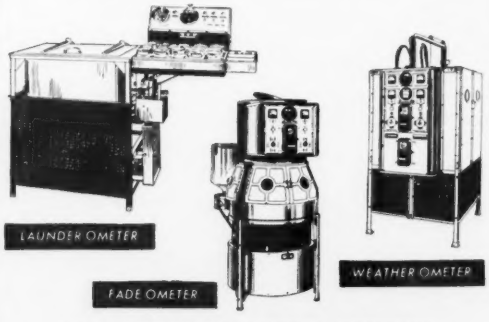
COULTER PRODUCTION MACHINES SINCE 1896

Don't Gamble on your product's reaction to weather

. . . when an
Atlas Weather-Ometer
can give you quick, factual answers

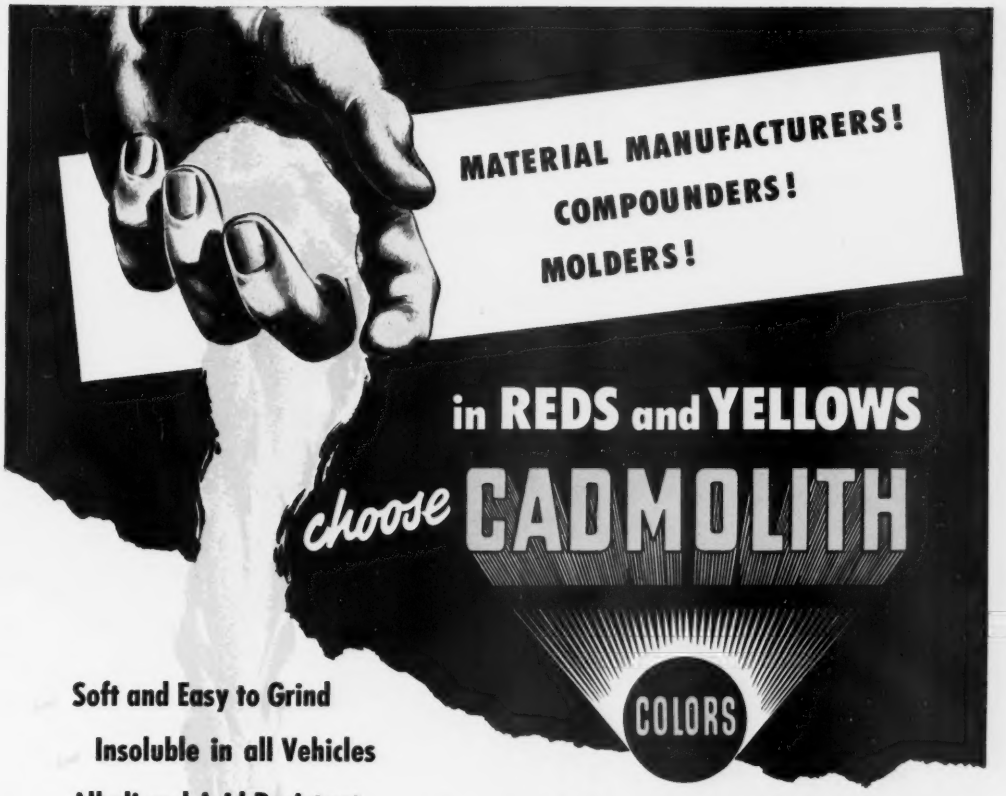
Any cycle of sun, rain, and thermal shock that you desire can be quickly set in the Weather-Ometer by merely changing the cycle cam. Then you just let this fully automatic machine take over. At the end of your test, the length of which can be predetermined, your samples are ready for analyzing — in a fraction of the time otherwise required. They will show fading, checking, cracking, warping or any of the other characteristics resulting from the climatic conditions mentioned above.

All Atlas Weather-Ometer tests may be precisely duplicated at any time. The machine may safely be left in continuous operation overnight, and can be set to shut itself off at any desired time.



ATLAS ELECTRIC DEVICES COMPANY
361 W. Superior Street • Chicago 10, Illinois

Manufacturers of accelerated testing equipment for more than a quarter of a century.



Soft and Easy to Grind
Insoluble in all Vehicles
Alkali and Acid Resistant
High Heat Resistance
Non-Fading to Light
Non-Bleeding
Wide Range of Shades
Opaque

for Rubber Materials

Glidden leadership in pigment research has produced in Cadmolith* Colors the very finest reds and yellows available anywhere —measured by every standard of importance to material manufacturers, compounders of new and old materials and plastic molders and coaters.

Send for Folder giving complete details, with color chips. Write The Glidden Company, Chemical and Pigment Company Division, Union Commerce Bldg., Cleveland 14, Ohio.

QUALITY **Glidden** PRODUCTS

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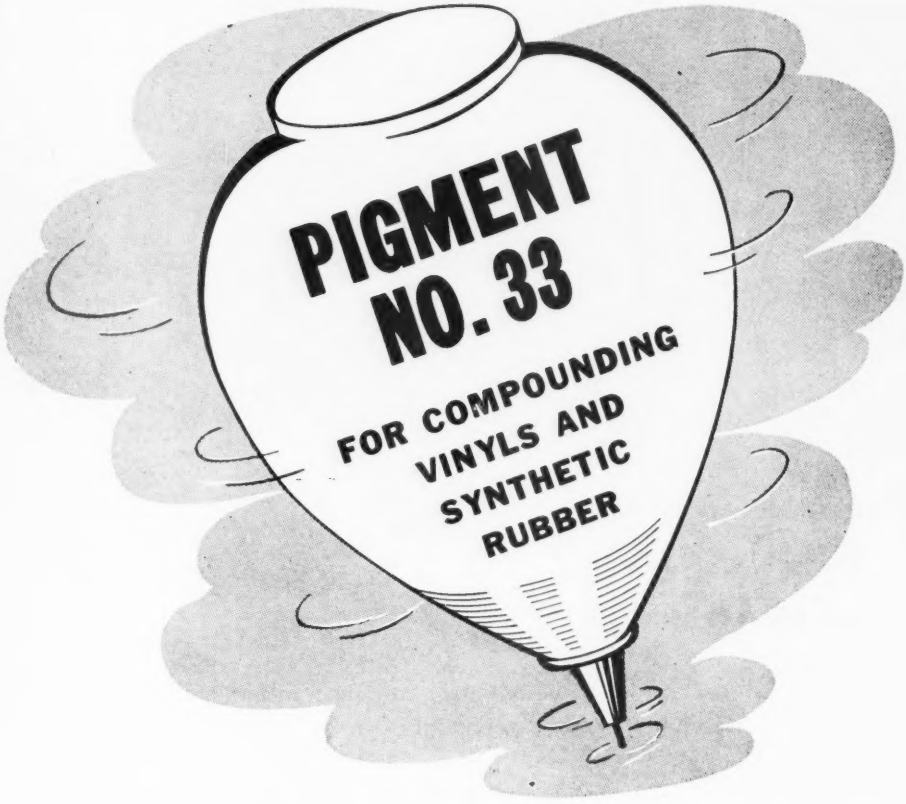
SUNOLITH* Lithopone
ZOPAQUE* Titanium Dioxide
TITANOLITH* Titanated Lithopone

IT'S "TOPS"



• SUPERIOR ELECTRICAL TESTS
• HEAT STABILITY
• COLOR

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

The walls come tumbling down!

THE WALLS OF JERICHO remained impregnable until a blast of seven trumpets released forces powerful enough to level the masonry.

Like Joshua's trumpets Di-tertiary-butyl Peroxide (DTBP) is a compelling initiator of action. DTBP catalyzes resin polymerizations. One example: the preparation of styrenated alkyds—raw materials for surface coatings that air-dry with unusual rapidity.

As a catalyst DTBP has important advantages. It gives high conversion efficiencies. Its decomposition rate is uniform . . . *governed entirely by temperature control.* Its action is independent of the kind of monomer, prepolymer or reaction medium.

DTBP leaves no color-forming bodies, no acid residues. It helps to produce clear or lighter colored polymers.

Further, DTBP is stable, insensitive to shock, non-corrosive . . . poses no storage or handling problems. And its high activation temperature allows premixing with monomer.

Get the full story now—send for our DTBP brochure. Your letterhead request will also bring you a sample for evaluation.

SHELL CHEMICAL CORPORATION

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Another WITCO-CONTINENTAL 1st

Palletizing

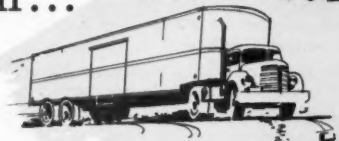
shipped by rail...

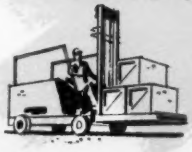
shipped by truck...

palletizing saves you

time and money

in carbon black handling!





for the carbon black industry...

...for more efficient, more economical materials handling

For many years shipments of carbon black in bags presented a problem. Handling of individual bags in loading and unloading was expensive and messy, especially in case of bag failure.

To solve this problem, Witco-Continental worked out a method of palletizing which permits the unloading of carbon black in unit loads by use of fork lift trucks equipped with chisel type forks. This unit load employs a fiber board sheet pallet especially suitable for fifty-pound bags of carbon black. These palletized loads fit both freight cars and trucks . . . enable you to unload in minutes rather than hours.

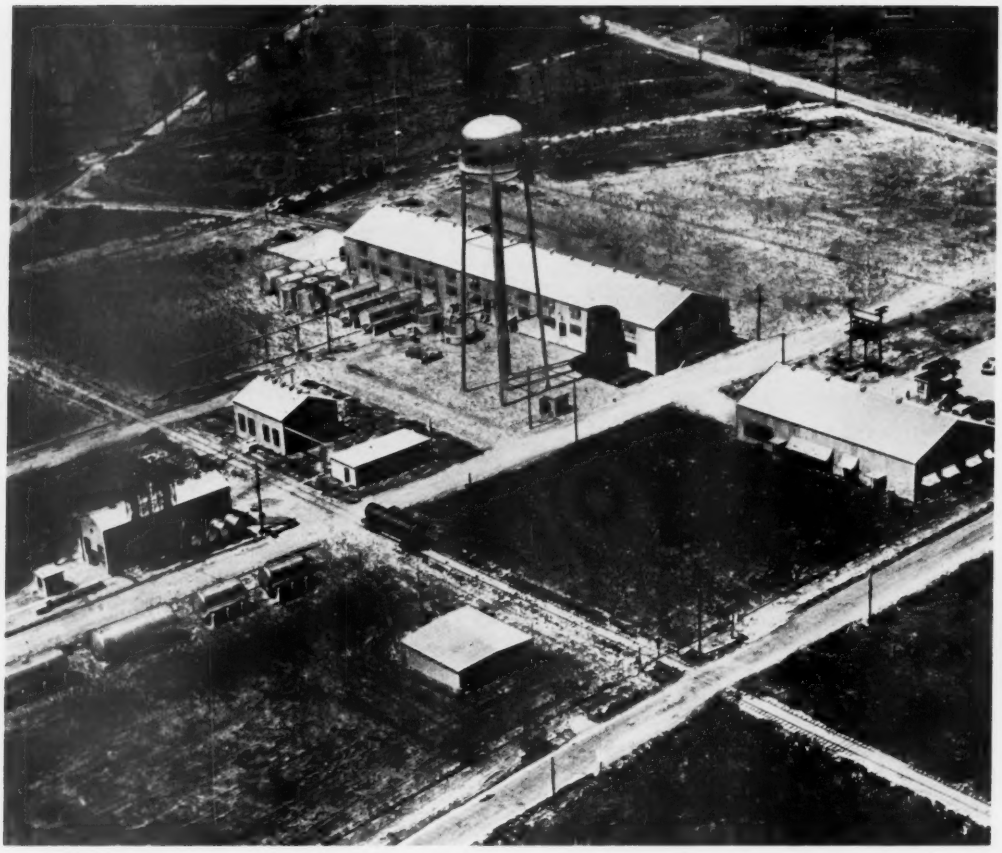
Palletized shipments are being requested by more and more users of Witco-Continental blacks. This more efficient and more economical method of materials handling is one further example of the new procedures and improved products that Witco-Continental is introducing for the carbon black industry.

WITCO CHEMICAL COMPANY

CONTINENTAL CARBON COMPANY

295 Madison Avenue, New York 17, N. Y.

Boston • Chicago • Houston • Los Angeles • San Francisco • Akron • Amarillo • London and Manchester, England



Thiokol* Corporation's new plant at Moss Point, Mississippi is now in operation

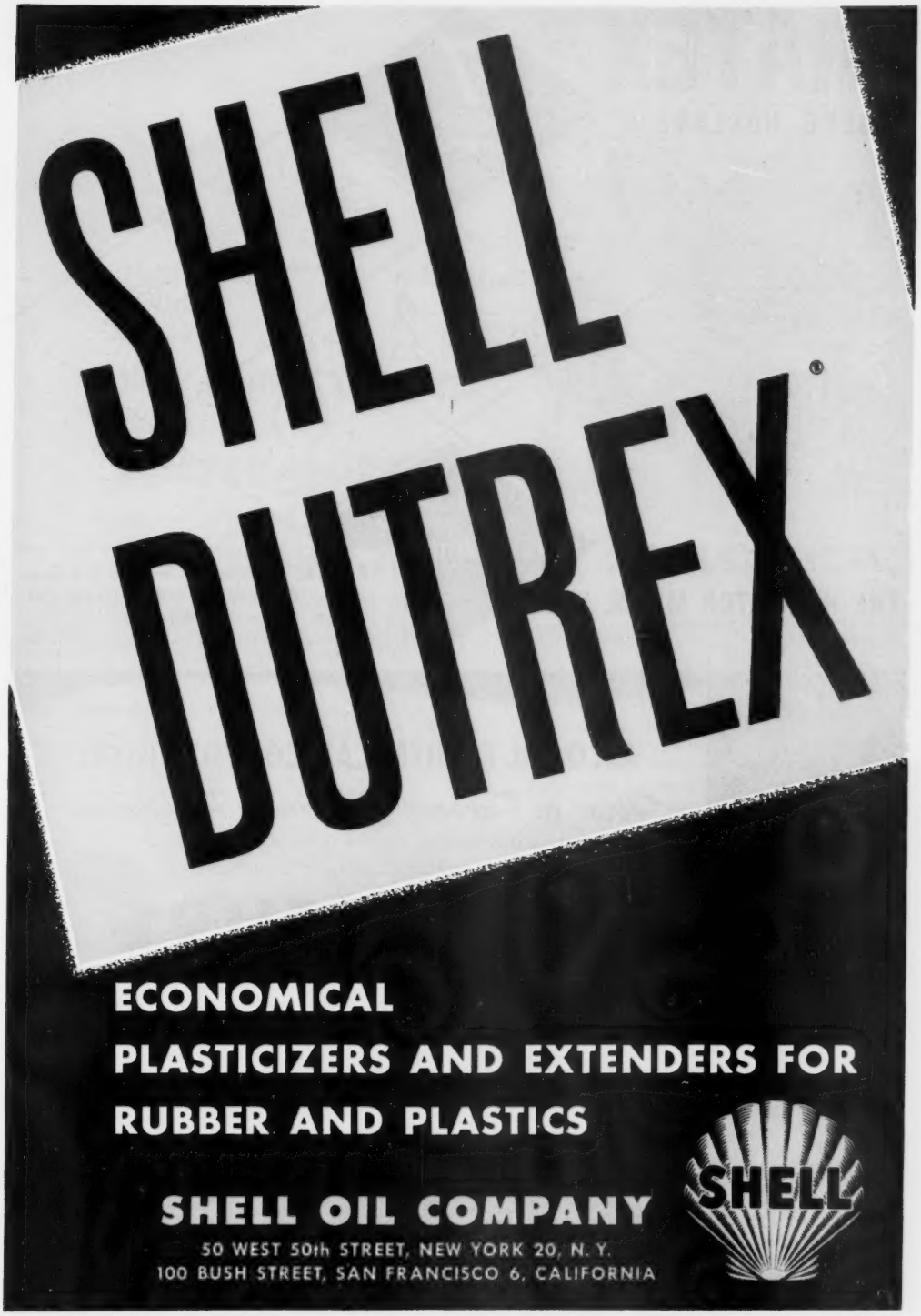
Thiokol Corporation's new liquid polymer plant is now in operation at Moss Point, Mississippi. This modern plant is designed to produce both Thiokol polymers and one of the basic raw materials for their manufacture.

These new facilities have been engineered to meet today's military and industrial requirements. They are designed so that production can be rapidly expanded should the need arise.

Thiokol* CORPORATION

784 North Clinton Avenue, TRENTON 7, NEW JERSEY

*Thiokol, Reg. U.S. Pat. Off.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The Institution of the Rubber Industry

LONDON

THE RUBBER INDUSTRY owes its development largely to scientific and technical research and the Institution was founded in 1921 to foster scientific and technical advancement and to disseminate the results.

THE INSTITUTION TODAY is the centre of a great fraternity of rubber manufacturers, scientists, technologists, research establishments, executives and students from every country whose object is the advancement of the cause of the rubber industry throughout the world.

OBJECTS: To promote corporate and concerted effort in the industry by bringing together all those engaged or interested in the various branches of science and technology on which the Industry is based and co-ordinating their respective contributions.

To promote the profession and practice of Rubber Technology.

To encourage the extension of scientific and technical education in the principles and details of rubber manufacture.

To maintain a scheme of Diplomas for the recognition of efficiency in knowledge of all branches of technology essential to the successful maintenance and development of rubber manufacture.

To arrange for the holding of meetings, the reading of papers and the giving of lectures with subsequent discussions and publication.

To foster the systematic study of scientific and technical problems involved in the various phases of the manufacture of natural and synthetic rubbers and rubber-like materials and their conversion into finished products.

To encourage original work and research dealing with the manufacture of rubbers.

PUBLICATIONS.

The Transactions: Bi-monthly record of scientific and technological investigations in the realm of rubber and its allied industries.

Annual Report on the Progress of Rubber Technology: containing systematic accounts of the developments in rubber technology from year to year.

Proceedings of Rubber Technology Conferences.

INVITATION TO MEMBERSHIP.

At this time of progress and expansion in the affairs of the Institution, its Council, conscious of the benefits that lie within the sphere of the Institution, invites applications for the privilege of membership from those engaged or interested in the Rubber and its allied industries.

Application forms and full particulars may be obtained from:—

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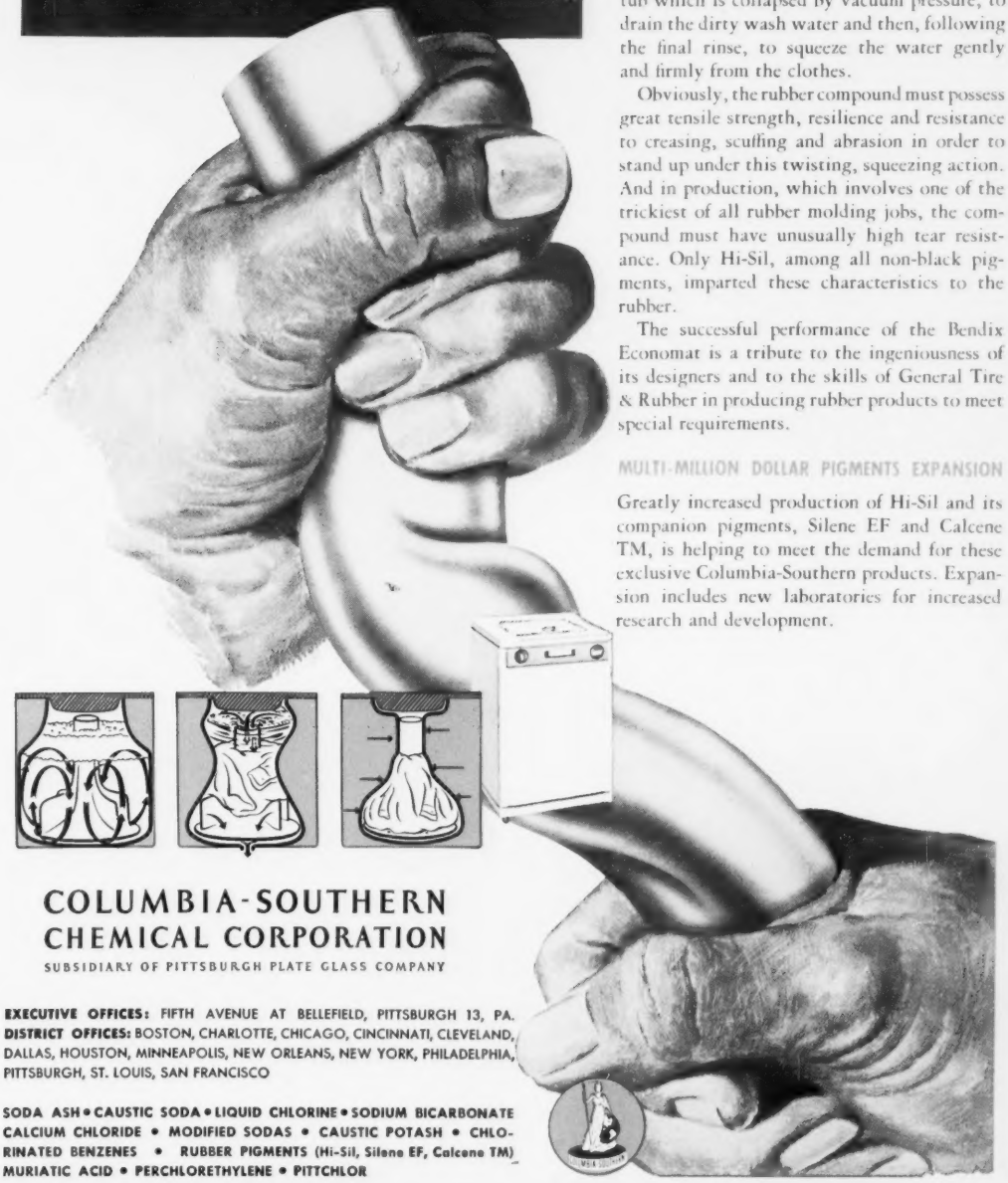
A tricky twist IN RUBBER SHOWS THE VALUE OF COLUMBIA-SOUTHERN'S hi-sil®



Faced with the problem of developing a light-grey rubber compound to meet an extremely exacting usage, the General Tire & Rubber Company found that only one non-black reinforcing pigment would meet requirements.

General's problem was presented by Bendix Home Appliances, in connection with the revolutionary design of its Economat automatic washer. The heart of this washer is the "Metexaloy Wondertub"—a flexible rubber tub which is collapsed by vacuum pressure, to drain the dirty wash water and then, following the final rinse, to squeeze the water gently and firmly from the clothes.

Obviously, the rubber compound must possess great tensile strength, resilience and resistance to creasing, scuffing and abrasion in order to stand up under this twisting, squeezing action. And in production, which involves one of the trickiest of all rubber molding jobs, the compound must have unusually high tear resistance. Only Hi-Sil, among all non-black pigments, imparted these characteristics to the rubber.

The successful performance of the Bendix Economat is a tribute to the ingeniousness of its designers and to the skills of General Tire & Rubber in producing rubber products to meet special requirements.

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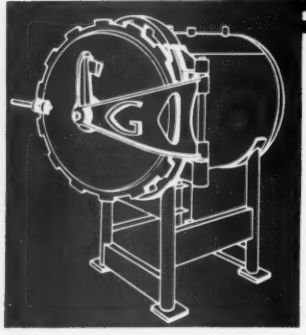
LABOR-SAVING
VULCANIZERS

Illustrated: vulcanizer built by Gussett for the new Marion, Ohio plant of the B. F. Goodrich Company of Akron, Ohio. 42" diameter, 69' long.



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tile linoleum
and other non-metallic
materials

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Stamford, Conn.

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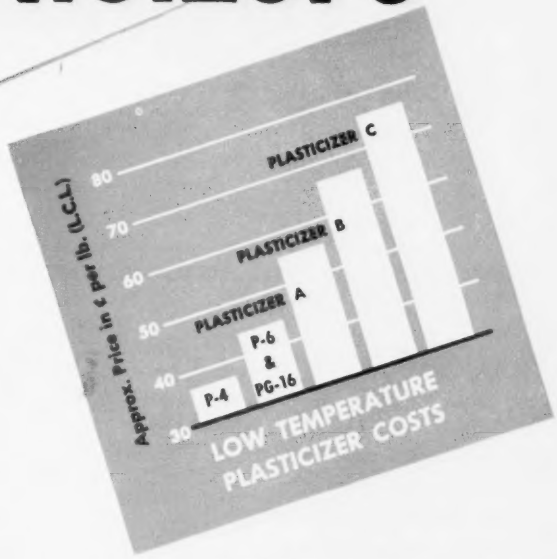
Plasticizers

Ricinoleates are fully equivalent and, in many cases, superior to the commonly used low temperature plasticizers. An added feature is their extremely low volume swell in aromatic fuels. Their cost is much lower. Check this graphic comparison and you will see that costs can be cut substantially.



Baker Ricinoleate Esters:

PG-16, Butyl Acetyl Polyricinoleate	25% Nitrile Rubber
FLEXRICIN® P-4, Methyl Acetyl Ricinoleate	40% Nitrile Rubber
FLEXRICIN P-6, Butyl Acetyl Ricinoleate	Neoprene GN
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	GRS

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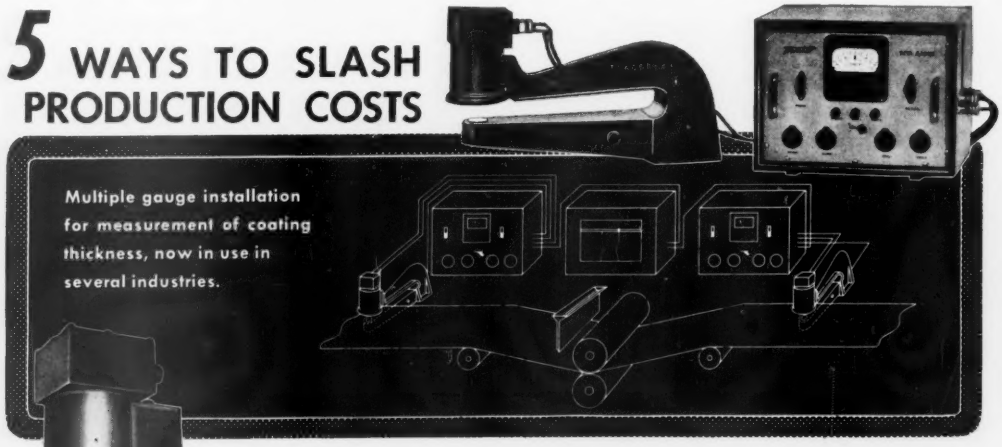
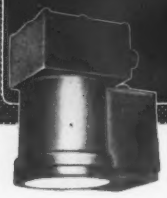
5 WAYS TO SLASH PRODUCTION COSTS





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Treating styrene monomer as the starting point for large-volume chemical manufacturing, this new book discusses manufacturing and application possibilities of Styrene Butadiene Emulsions, Styrene Polyester Resins, Elastomers, Styrene Modified Alkyd Resins, Styrenated Oils, Ion Exchange Resins, Adhesives and Bonding Agents . . . Under each of these major headings is included a discussion of end products which are being developed in constantly increasing number.

Now, with *doubled capacity* for producing styrene monomer in its enlarged Texas City plant, Monsanto becomes one of the country's leading sources of this reactive raw material.

To private industry, this is welcome news. It means a greatly increased supply of monomer—made to rigid Monsanto standards—for the production of resins and copolymers . . . Available in tank-car and 55-gallon drum lots . . . MONSANTO CHEMICAL COMPANY, Texas Division, Texas City, Texas.

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ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

New Protox-168: First Fast-Curing Zinc Oxide to Impart Both Higher Reinforcement and Easier Processing

Whether you are using a fast-curing zinc oxide for *reinforcement* or for *activation alone*, you will find that Protox-168* provides many outstanding advantages.

In activating amounts

Protox-168 imparts high activation efficiency:

1. Because of high surface area (8 sq. meters per gram for Protox-168 vs. 3.5 sq. meters per gram for many fast-curing oxides)
2. Because of more complete dispersion of Protox-168 — resulting from its propionic acid treatment

In addition, Protox-168 even in activating amounts provides shorter mixing time, easier processing and higher modulus.

In reinforcing amounts

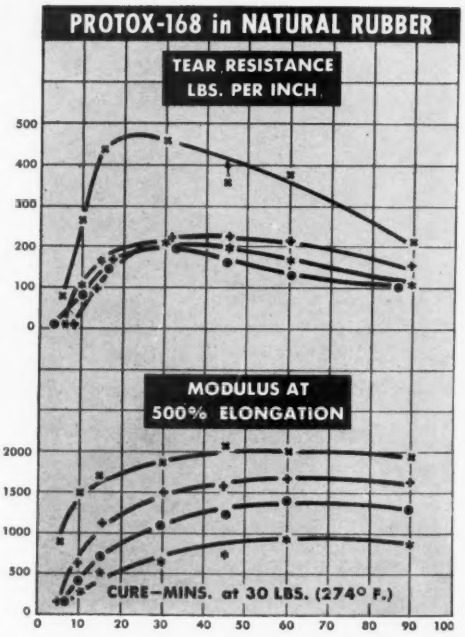
Protox-168 cuts production costs through shorter mixing time, smoother calendering and tubing, and improves quality through higher modulus and tear resistance.

Note in the accompanying chart the progressive increase in modulus of the test compound as the Protox-168 loading is increased above activating amounts. The tear resistance for the 100-part loading of Protox-168 is also of interest.

These important advantages of Protox-168 stem from both the unique coating of zinc propionate on the particles and the greater surface area of the base zinc oxide.

If you are not yet using Protox-168, may we send you samples?

*U. S. Patents 2,303,329 and 2,303,330



COMPOUND	
RUBBER	100
SULFUR	3
MBT	1
STEARIC ACID	3
ANTIOXIDANT	1
PROTOX-168	VARIABLE

PROTOX-168 LOADINGS
- *5 parts
- ● 25 parts
- + 50 parts
- ×100 parts

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

. . . most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

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The whole family steps out in style!

. . . thanks to NEVILLE Coumarone Resins

Why not call on Neville's years of experience and "know-how" to help you in your particular problems.

• PRODUCTS OF TOMORROW FROM THE CHEMICALS OF TODAY

The buyer of shoes looks for style, lightness, flexibility, comfort, waterproof protection and long wear!

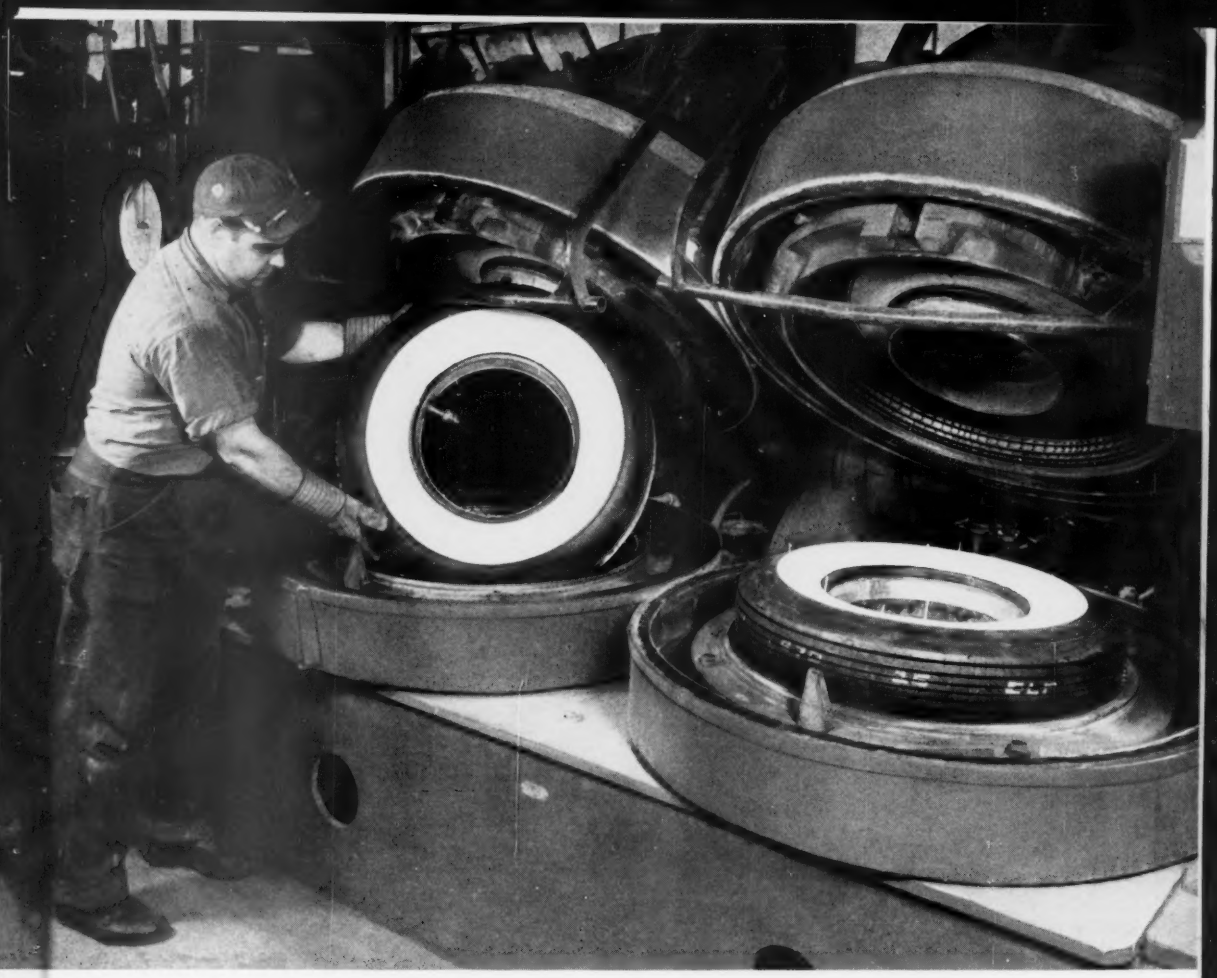
The manufacturer, on the other hand, in order to guarantee these necessary selling points, seeks tensile strength, abrasion resistance, flex-life and uniform quality in the stock he uses for producing quality foot-wear!

That's why Neville Coumarone Resins are being used in sole and heel compounding in ever-increasing volume. Through them manufacturers enjoy improved properties and production advantages, building tack in their compounds without sacrificing hardness, tensile or tear.

THE NEVILLE COMPANY • PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

C 3



In processing, one of the country's large tire manufacturers has used Circo Light Rubber-Process Aid for white sidewalls for 13 years. Little or no staining occurs, because Circo does not migrate. Uniform results are obtained day after day, and production figures are regularly high, for Circo speeds milling time, furthers aging and curing.

THESE "JOB PROVED" SUN PRODUCTS HELP IMPROVE QUALITY AND REDUCE OPERATING COSTS

In tackling your problems, a Sun representative draws on the wealth of experience he has acquired working with many different manufacturers of rubber products. If the technical nature of your problem calls for it, one of a special group of Sun chemical engineers will also go to work in your behalf. Back of them, remember, are the vast research, development and refining facilities of Sun Oil Company.

When a Sun representative recommends one of our process aids, he does so with complete confidence in its quality. Every product developed in Sun's laboratories is exhaustively tested by actual use in industry until there is clear evidence that it has the desired characteristics. Then, and only then, is it rated "Job Proved" and offered for sale to industrial plants.

All of this is your assurance that Sun products will help you improve quality, speed production, and lower operating costs. For complete information on Sun process aids, or the services of a Sun representative, call or write the nearest Sun Office.

RUBBER-PROCESS AIDS

CIRCOSOL-2XH. An elasticator and process aid for natural rubber and especially for GR-S. Outstanding for sponge rubber.

CIRCO LIGHT PROCESS-AID. A processing agent and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber. Used for GR-S to some extent.

SUNDEX-41. A dark, free-flowing product that helps prevent scorching during mixing, milling and extruding of "cold rubber" treads and similar compounds. Contributes to improved wear resistance and flex life.

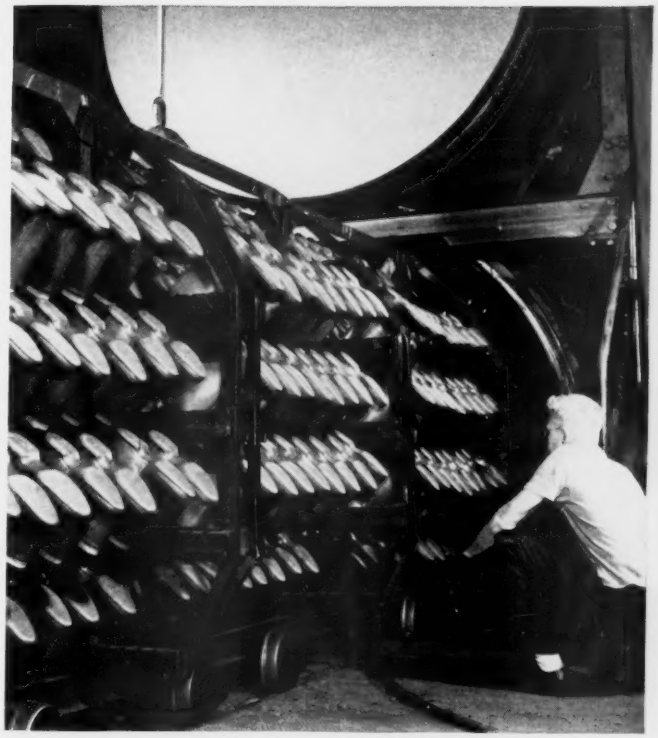
SUNDEX-53. An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established process aid for rubber footwear stocks and semihard rubbers.

CIRCOMAR-5AA. A dark-colored product for processing natural and GR-S rubber used in tire-making. Also used in reclaiming natural-rubber scrap. Replaces asphalt fluxes. Free flowing at room temperature.

CIRCOMAR-25. A heavy, viscous, dark liquid softener of the asphalt-flux type for natural rubber, GR-S polymers, or blends of the latter with natural rubber. Used in the manufacture of tires.

SUNAPTIC ACID-130. For compounding neoprene latex. Replaces stearic acid as an activator. Functions also as a softener.

A maker of rubber sponge had trouble with ordinary processing oils. They migrated, bloomed and affected his reclaim resin type adhesives. He found the answer to the problem in Circosol-2XH. The extra margin of safety in this Sun rubber-process aid has speeded production for him.



To reduce operating costs, this plant making rubber footwear ran comparison tests on 16 softeners for natural and GR-S stocks. Sundex-53 was selected. In fact, only one other product—at a much higher price—could compare with it at all in assuring proper resilience, required elongation.

SUN INDUSTRIAL PRODUCTS

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VOLUME 71
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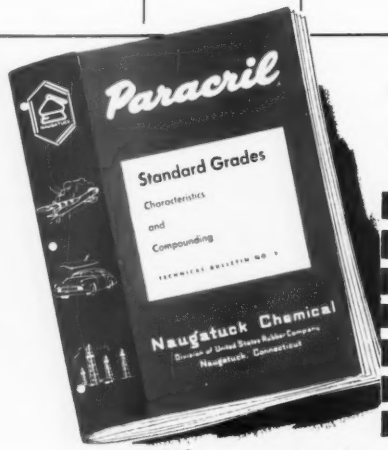
18-80 AJ	NITRILE CONTENT LOW	As nitrile content decreases	• low-temperature resistance improves • resilience increases • hysteresis properties improve



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RUBBER AGE

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New Applications of Rubber on Decks of Naval Vessels

By ELMER F. GREENLEAF*

Senior Materials Engineer, Elastomer Branch, Bureau of Ships, Navy Department, Washington, D. C.

FEW persons realize that literally tons of rubber products are used aboard ships of the United States Navy. Recently, some of the many applications within this vast field were described by Werkenthin†. Interesting postwar developments have included the introduction of rubber products designed to protect decks, and rubber compounds to provide watertight seals in deck seams. Modern naval vessels are using increasing amounts of attractive new deck covering materials, particularly for interior spaces which vastly improve appearance and comfort aboard ship, in addition to increasing safety. These improvements have a noticeable effect on morale of both officers and enlisted men.

The widespread application of deck coverings in recent years is due not only to greater emphasis by Navy designers and engineers upon safety precautions of this type, but also because new electronic equipment and increased amounts of electrical apparatus have greatly augmented hazards of electrical shock, and further, because only recently have satisfactory deck covering materials been available. Even before World War II, the Navy was urging manufacturers to develop products suitable for deck surfaces, but not until several years after the War did a choice of materials become available for various shipboard applications.

Note: The opinions or assertions contained in this article are the private ones of the author and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

* Now associated with the Atomic Energy Commission, Washington, D. C.

† Werkenthin, T. A., "The Extensive Utilization of Rubber and Plastic Elastomers in the U. S. Navy," *R. A. (N. Y.)*, Vol. 68, No. 4, pp. 435-42 (Jan., 1951).

Deck Covering Characteristics

Many exacting needs make up the general requirements of deck covering for naval vessels. Obviously, resistance to shattering or splintering due to the shock of gunfire or the explosion of shells and bombs is important, for flying fragments of deck covering could injure personnel or cause additional damage to a ship. A certain amount of flexibility is imperative in a suitable material, because of expansion, contraction, or flexing of the decks. A deck covering must be unaffected appreciably by contact with oil, gasoline, or solvents; must be impervious to liquids which might corrode the deck; and may contain no ingredients which themselves would deteriorate the deck.

In addition, satisfactory materials necessarily need excellent resistance to abrasion, cutting, gouging, tearing, and other wear or damage due to heavy foot traffic and the movement of stores or equipment. At the same time, the deck covering must offer good resistance to slipping, for this is one basic reason for its use. Weight, always a critical factor on a fighting ship, must be kept to a minimum in design and use of deck coverings.

Ideal material also would possess numerous other less essential properties. For example, deck covering should be sanitary, free from unpleasant odors, and offer no

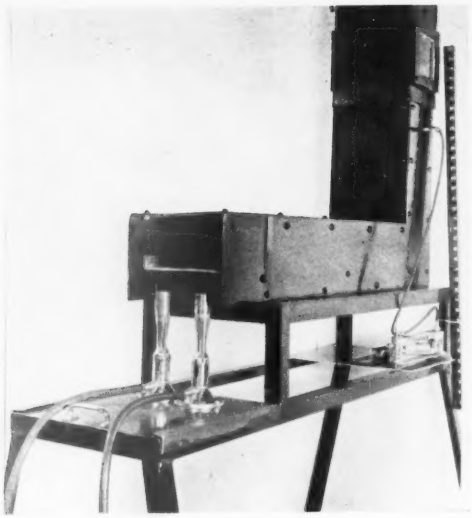


FIG. 1—Apparatus for measuring fire resistance.

harm to personnel even when in bare feet. Because appearance and comfort are highly significant in the acceptability of a deck covering by ships' crews, the material should be neat, attractive, of pleasing color, and easy to keep clean. In the event of unavoidable damage, it is highly desirable that the deck covering be easily and quickly repairable by the regular ship's crew, without having to close off the deck areas for long periods during repairs.

Fire Retardance

This impressive array of requirements might have been met easily by a number of commercially available products had it not been for the imposition of the additional very important demand for fire retardance. World War II had taught grim, costly lessons in the importance of fire retardance aboard ship. Even though "absolutely fireproof" materials had been sought for deck coverings long before the Pearl Harbor attack, few sufficiently fire-resistant compositions were developed until after 1945.

To determine the resistance of materials to combustion under conditions simulating those of a shipboard fire, a test method which exposed deck covering to open flames under controlled conditions was developed at the Material Laboratory of the New York Naval Shipyard. As shown in Figure 1, a long steel plate to which a sample was adhered could be placed in a flue with controlled draft, and subjected to flames from two gas-fired Meker burners. After many experiments, fire-retardant compositions of several deck covering materials were found which would burn only slightly in this test, in contrast to control samples of standard materials, which usually burned completely. A comparison between three samples of rubber matting of varying combustibility is shown in Figure 2.

Full-Scale Fire Tests

When the laboratory test method began to reveal deck coverings with significant differences in fire resistance, some of which appeared promising, it became essential to determine how well these laboratory findings correlated with results which might be expected under actual conditions in shipboard fires. Accordingly, a series of full-scale tests was initiated at the Philadelphia Naval Shipyard, with the cooperation of the Damage Control Center.

Samples of about 50 square yards each were installed in a full-size structure built to represent a section of an actual ship, and fires were ignited in the structure under controlled conditions. Observation and study of the results of these large fires generally confirmed both the qualitative and quantitative evaluations which the laboratory tests had placed upon the fire retardant qualities of a deck covering. For example, standard rubber matting burned vigorously in these tests and was almost completely consumed. In contrast, matting rated fire-retardant by laboratory evaluations showed very limited burning in the simulated shipboard fires.

The lengthy program of laboratory and full-scale tests indicated that despite the severity of the fire resistance requirements which safety demanded, materials were available which could comply with these needs. After several years of difficult development work, it was gratifying to determine that rubber compounds could be made which would satisfy the rigid standards of fire retardance.

Mats and Matting

At present, rubber matting, covered by Specification MIL-M-15562, is being installed in substantial quantities aboard naval vessels. Most of this is used around electronic or electrical equipment, to protect men against shock from accidental short circuits between apparatus and the steel deck. The newest application of fire-retardant rubber matting is installation of lightweight (1/8-inch thickness or less) material, preferably in colors other than black, in wet spaces and similar areas aboard ships.

Rubber also is being investigated for use in standing mats, intended to absorb vibration and reduce fatigue in places where men are required to stand for prolonged periods with little freedom to move about. Use of a

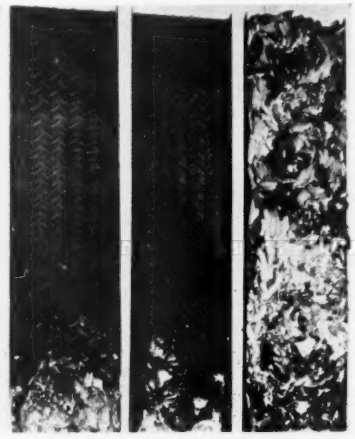


FIG. 2—Samples of fire-resistant and standard rubber matting after exposure to fire test.

3 x 4-foot mat on the bridge, for example, may improve the efficiency of a man on watch. Where such mats have been installed on service trials, their reception generally has been enthusiastic, and if satisfactory compositions can be developed standing mats are likely to find quite widespread use aboard naval vessels. A specification, MIL-M-910, has been prepared to describe the properties of these mats. Figure 3 illustrates a cross-section of an experimental mat, while the presently specified design is shown in Figure 4.

Compounding Ingredients

The development of rubber matting conforming to rigid Navy specifications, capable of insulating against high voltages, and at the same time meeting the demands of fire retardance, was long regarded as virtually impossible by many in the rubber industry. Accomplishment of this difficult task represents a major feat of technical compounding. Development of a standing mat, however, has proven an even more exacting task, for superimposed upon the problem of obtaining fire-retardant compositions is the added difficulty of developing vibration absorption while maintaining high strength, weather resistance, long wear and many other requirements.

At first glance, compounding of rubber matting to obtain fire resistance may not seem an unusually complex problem. Certain initial concepts are almost obvious. For example, neoprene is the natural choice for a base polymer, since it is the most flame-resistant of the commonly used synthetic or natural rubbers. Loading pigments should be inert ingredients (such as clay), or possibly ones which decompose only at high temperatures but give off non-combustible products. Use of plasticizers known to reduce flame resistance (tricresyl phosphate and the like) should help reduce combustibility of a compound. Since highly chlorinated substances generally have considerable resistance to fire, increasing the chlorine content of the compound by addition of chlorinated hydrocarbons (such as chlorinated paraffin or chlorinated waxes) has been suggested. These latter materials, however, may degrade other physical properties unless used in small amounts. Lastly, reduction of afterglow by the addition of chemicals such as antimony oxide or zinc borate, as is common practice in coated fabrics, may offer some aid.

Some effect on afterglow may be obtained by proper selection of the fire-retardant fabric backing or insert which is required in rubber matting for shipboard service. Treated cotton has been found to be superior to asbestos cloth, due to the persistence of glowing which appears to be characteristic of asbestos cloth. Since flame-proofing of fabrics has become a relatively well-known technique, selection of a treated cotton which actually improves the fire resistance of a deck covering may be accomplished with comparative ease.

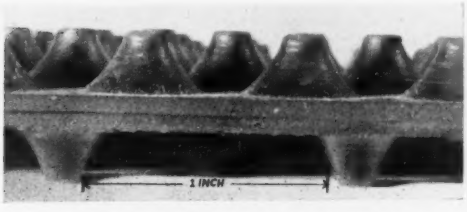


FIG. 3—Cross-section of sample standing mat.

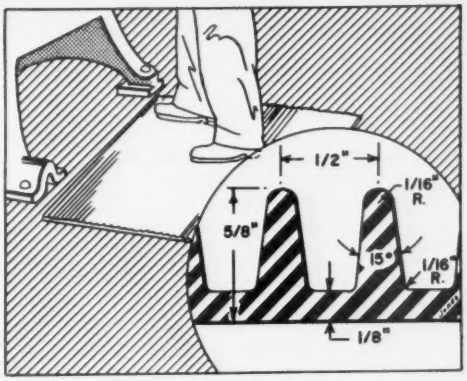


FIG. 4—Specified design of standing mat.

Despite these well-known approaches to the development of fire-retardant compounds, few in industry have succeeded to date in producing commercial quantities of matting capable of passing the Navy's rigid fire tests. Many confident compounders have learned to their sorrow that although material may meet "flame-proof" requirements of various industry and government specifications, these compounds cannot readily be improved sufficiently to resist the prolonged exposure to high heat and direct flame which deck coverings must face to be considered "fire retardant."

Latex-Mastic Compounds

Fire resistance has never been a particularly taxing problem for latex-mastic deck coverings, for inherent limited combustibility is one of their numerous advantages. These materials, made from a mixture of synthetic rubber latex, Portland cement, and a coarse particle mix (such as marble chips), offer attractive, long-wearing, easy-to-clean deck coverings which appear much like polished concrete when installed. In the past they have been applied in galleys, washrooms, shower stalls, and other spaces where slipping on wet or greasy steel surfaces presented a constant hazard. More recently, modified mastic compounds have been installed on weather decks of several naval vessels to determine their suitability for exterior use. Both interior and exterior applications of these materials are covered by Specification MIL-D-3134.

One disadvantage of all the present mastic deck coverings which has limited their use aboard ship is their high weight per unit area. In naval vessels every pound of added weight means additional problems to design engineers and naval architects. The limits become more critical when the increase occurs far enough above the waterline of the ship to affect its stability. Hence, deck coverings are particularly limited in their application by this weight factor. If industry can develop improved latex-mastic compounds which are substantially lighter, considerable use of these materials aboard ship can be predicted. In this event, substantial quantities of synthetic rubber latex and allied ingredients would be needed.

Conductive Deck Covering

Rubber, either in the form of latex or compounded solid polymers, offers promise in solving the very diffi-

cult problem of developing conductive deck coverings. In contrast to the electrically insulating mattings mentioned above, some form of deck covering with limited conductivity is needed in hospital spaces and ammunition handling rooms aboard ship, to prevent sparking due to accidental discharge of static electricity. The conductivity limits of such a material have not been definitely established, but probably will be similar to those required by hospitals ashore.

At present, the field is entirely wide open for conductive deck covering materials, for none has been found which simultaneously provides the desired conductivity characteristics, fire retardance, and other requisites of shipboard deck covering. Conductive rubber matting has long been used in industry where static electricity presents a hazard. However, to date no one has succeeded in incorporating conductivity and fire retardance into the same rubber compound. Nevertheless, the many advantageous characteristics of rubber matting would make such a material more desirable than many others, if the desired properties could be developed. Even the existing conductive rubber matting is being considered for ammunition handling spaces, where static electricity is extremely hazardous, but where fire retardance of the deck covering is of less importance. Obviously in the presence of highly combustible materials such as munitions, if a fire breaks out, it will be of little concern whether the deck covering also is burning.

Latex-mastic materials have been compounded, usually by the addition of acetylene black, which are fire-retardant and afford satisfactory conductivity characteristics at the time of installation. However, these flooring materials vary tremendously in electrical properties with changes in humidity and thus may not retain conductivity within specified ranges. The many desirable properties of mastic deck coverings would make them readily applicable to shipboard hospital spaces if conductivity could be incorporated which would be constant and uniform under varying conditions of service. Accordingly, the latex mastic compounds, together with rubber matting, offer the most promise for research and development by rubber compounders who seek conductive deck covering materials.

The prospective uses by the Navy of conductive deck covering are unlikely to represent substantial volume procurements. However, the great interest which has been shown by other agencies in the Navy's development program indicates that any material which meets the rigid requirements for shipboard operating rooms would be likely also to receive enthusiastic acceptance by government and private hospitals throughout the nation.

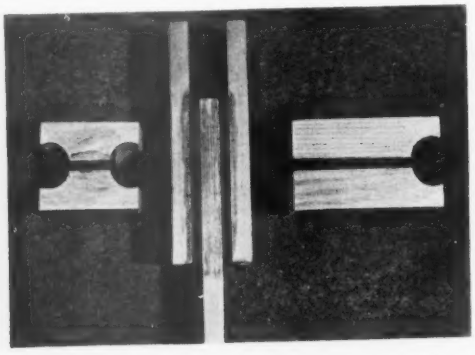


FIG. 5—Laboratory test specimens for determination of tension, shear and cleavage in calking compounds.

Deck Seam Calking

Surprising as it may seem to the uninitiated, wooden decks still play an important role in many modern naval vessels. The flight decks of most present-day aircraft carriers are constructed of teak, fir, or laminates of these woods. The seams between planks of these decks must be sealed with a watertight substance, to prevent moisture from penetrating underneath or through the decks. For many years, an asphaltic mixture called "marine glue" formed the principal ingredient of all seam calking.

Introduction of jet planes aboard carriers quickly demonstrated the need for a new calking compound. Marine glue softened, became sticky, and lost its sealing abilities when exposed to jet fuels. Even worse, when subjected to the heat and blast of jet engine exhausts, marine glue softened and ran all over the carrier decks, as Werkenthin has already reported.

To seal the seams of wooden flight decks, therefore, a new material is needed. The ideal calking must be liquid, of such consistency that it can be poured into relatively narrow seams, yet capable of setting up to solid form in a reasonably short time. It must have excellent adhesion to wood, and at least some flexibility. Once installed, the calking should be affected little by temperatures ranging from —20°F. to several hundred degrees above zero, or by exposure to water, fuels or sunlight. Because expansion or contraction of wood planks causes substantial changes in seam sizes, the sealing compound may be required to stretch at least 100 per cent and possibly more. Laboratory test specimens for the determination of tension, shear and cleavage in calking compounds are shown in Figure 5.

Previous experience in installing experimental materials indicates that the calking compound should be a liquid polymer which can be applied with no solvents or volatile liquids. Where seams have been calked using solvent-based mixtures, difficulties have invariably been caused by entrapment of solvent bubbles.

Suitable calking materials also are required to be readily applicable by regular shipyard or shipboard personnel. Furthermore, their setting time must not be so long as to unduly delay traffic over the deck area under construction. In addition, the installed material must be repairable while at sea, if necessary. Conversely, uncured calking compound should be capable of being carried aboard ship for emergency installation by ships' crews when occasion demands.

Materials Developed to Date

The best available materials developed to date to satisfy these numerous requirements are liquid polymer polysulfide (Thiokol LP-2) compounds. Considerable investigation has been devoted to the possible use of neoprene compounds, but with no success as yet. Development of suitable calking compounds capable of meeting Specification MIL-C-16085 is a project worthy of the attention of the rubber industry. In addition to the considerable quantities of material which will be procured for wooden flight decks of aircraft carriers in the next several years (Figure 6), there is also need for slightly modified compounds to be used for calking hulls of wooden vessels and for sealing double-planked wooden hulls of small craft.

Summary

Possibilities exist for the use of considerable quantities of rubber aboard ship in various decking applications, such as synthetic rubber matting, standing mats, latex-mastic compounds and seam calking. Development of these new materials will probably continue to be accomplished to a large extent by interested industry laboratories, at their expense, but with the collaboration and assistance of engineers and technical personnel of the Navy.

As shipboard conditions arise that require entirely new materials, development programs have been carefully evolved according to the following steps: (1) Definition of the requirements by observation and study of needs exhibited under actual service conditions; (2) Development of laboratory techniques for determining how well materials meet these requirements; (3) Correlation of results obtained by these laboratory methods with full-scale tests, in order to confirm the validity of proposed specification requirements; (4) Assurance that materials which comply with the proposed specifications have been shown to be either commercially available or feasible for production.

Under this development program, sound practical values are being established which will permit rapid expansion of the use of deck covering and calking materials. Substantial quantities of widely differing rubber products will be required to satisfy these exacting needs. These present and potential shipboard applications merit careful scrutiny from the rubber industry.

FIG. 6—View of an aircraft carrier flight deck calked with synthetic rubber compound.

ACKNOWLEDGMENTS

The author regrets that full credit for the careful, thorough investigations which have formed the basis for this paper cannot be accorded specifically to the many members of the Navy team who have contributed so much. These include the engineers and technical personnel of the Material Laboratory of the New York Naval Shipyard, the Industrial Test Laboratory and the Damage Control Center at the Philadelphia Naval Shipyard, the Rubber Laboratory at Mare Island Naval Shipyard, and the Materials Laboratory at Puget Sound Naval Shipyard. Similarly, the invaluable contributions of members of industry toward solution of the problems described cannot be individually recognized.

In addition, the aid and advice of Messrs. I. D. Gessow, L. Birnbaum, J. H. Chilcote, and E. A. Bukzin of the Bureau of Ships is deeply appreciated. Particular acknowledgment is offered Mr. T. A. Werkenthin, Head, Elastomer Branch, Bureau of Ships, whose leadership inspired and encouraged this paper. Lastly, full appreciation is hereby expressed to the Bureau of Ships, Department of the Navy, for permission to publish this article.

Safety in the Rubber Laboratory

FREQUENTLY neglected in the over-all safety program of the small rubber plant is the rubber laboratory. Here, due to inadequate guarding and unsafe practices, many severe accidents continue to occur each year.

Perhaps the most serious accident potential in the rubber laboratory is the power-driven machinery usually present there, such as small rubber mills, calenders, etc. Whereas the larger production machines in the mill room are usually well guarded, the miniature models in the laboratory are frequently overlooked. Yet a 12-inch mill can mangle a hand or arm quite as easily as a 60-inch mill. In addition, the actual hazard of the small laboratory size mill is even greater than that of the production mills because the diameter of the roll is so small that the employee's hands are always closer to the "bite" when working stock. Barrier type safety-switch actuating devices can be installed on these mills as well as knee level safety bars. Such installations have proved themselves in many plants and will eliminate many serious finger and hand injuries.

Many laboratory machines are heated by means of steam thereby creating a hazard if not corrected. All steam pipes should be covered with pipe covering to prevent laboratory workers from being burned.

The fire and explosion hazard is ever present in the rubber laboratory. Rubber solvents are used in many laboratories and all are highly flammable. No solvents should be allowed in uncovered containers in a room with an open flame. Approved safety containers should be used for all solvents and, when possible, open flame burners should be replaced by steam or electrical hot plates.

Laboratory workers should be furnished with a safety shower and eye baths should be available in case of acid burns to the eyes or body. The rapid application of water will often eliminate a possible permanent injury.

In some small laboratories during various periods of the work shift, only one employee may be on duty. In such cases it is advisable to install an alarm bell with a control in a centrally located position so that other employees in the plant can be advised immediately of any emergency occurring in the laboratory.

Finally, the laboratory employee should not be overlooked when safety committees are being formed or when safety meetings are held. The need for safety indoctrination and education among laboratory workers is equally as great as in any production department of the small rubber plant.

Rubber Section, National Safety Council

Automatic Vinyl Casting Machines Designed for Large-Volume Mass Production

THE Sun Rubber Co., of Barberton, Ohio, is the world's largest manufacturer of rubber dolls and playthings, and for many years has been a major producer of athletic balls, stationery supplies, household wares, drug sundries, and mechanical rubber goods in general. It was natural therefore, that the company launch an extensive investigation into the possibilities of the vinyl plastic materials when such materials became commercially available. After more than five years of research and development, the company has now publicized details on what is believed to be the first automatic vinyl casting machines designed for large-volume mass production.

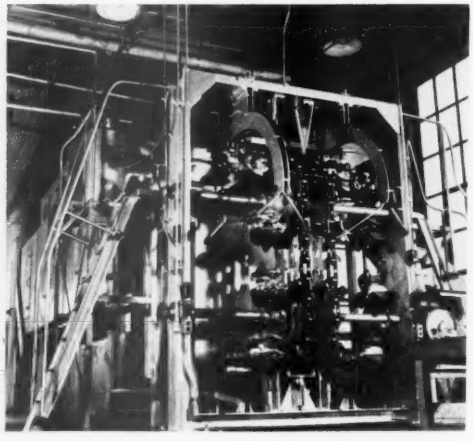
The giant machines, each capable of turning out over 100,000 finished dolls and toys a day, incorporate the latest developments in rotational molding. Sun's new equipment, which is initially producing a new line of Sunruco vinyl toys and dolls, can easily be adapted to various drug sundries and industrial applications.

At present, Sun has three of its casting machines in operation with a total capacity of several million pieces a month. The machines are completely automatic, the only manual operation being the removal of the finished products from the molds.

Each machine has two continuously-moving conveyors, to each of which a large number of production molds are attached. The molds move in a continuous cycle on the conveyors, during which all of the operations are performed automatically. All molds are designed and made in Sun's own plant.

The molds are mechanically loaded by means of an automatic injector and measuring device, which delivers to each mold a fixed charge of the vinyl material. When exactly the right amount of vinyl material has been loaded, the injector automatically withdraws, the mold closes and locks automatically.

Molds unlock and open in a fixed vertical position in the new vinyl casting machines, thus permitting easy removal of the finished product by the operator.



Close-up of one of the new rotational-type vinyl casting machines now being used by Sun Rubber Co.

Immediately after the mold locks it begins rotating to distribute the charge of vinyl material over the inner surface of the mold. The machine has an ingenious mechanism for rotating the molds which assures an even distribution of the vinyl over the mold's entire inner surface. Following the required number of rotations for distributing and gelling the liquid vinyl, the mold enters the fusing oven.

The mold continues to rotate until after it has passed through the fusing oven. It then moves through air-cooled chambers where mold temperature is reduced. At the end of the cycle, the mold emerges from the cooling chambers and automatically unlocks and opens.

The open mold containing the finished product is then in a fixed vertical position for easy unloading by the operator. From the operator's station, the mold progresses to the charging point where it is again loaded and a new cycle begins.

The rotational-type vinyl casting equipment in use at Sun is said to have many advantages over both slush molding and existing rotational molding processes. The new machines minimize the waste and contamination of vinyl material, which has always been a problem for slush molders. At Sun, only the predetermined amount of vinyl material needed for the finished piece is poured into the mold. Unlike slush molding, there is no need for emptying out excess material at one stage of the process. Consequently, closed molds can be used and the finished product does not necessarily need to have an opening.

The Surface Coating and Impregnation of Fabric

By C. A. LITZLER

President, Industrial Ovens, Inc., Cleveland, Ohio.

THE rapid advances that are being made in our defense and peacetime production requirements are greatly increasing interest in and demand for processing data on the surface coating and impregnation of textile materials. This is due to the fact that both surface coating and impregnation are basic and important manufacturing operations in the expanding rubber and coating industries. Also, it is due to a definite need to improve process equipment for coated or impregnated products. There is, likewise, the ever important need for reduction of manufacturing costs through the increase of production rates with equal labor costs. There is, in addition, considerable interest in the continuous production of end products which are now manufactured by other methods which, logically, can be continuously produced by the spreading or saturation methods.

It is the purpose of this discussion to outline broadly the general design considerations and application techniques of many types of coating machines for fabric surface coatings and saturating systems for fabric impregnation. Most of the emphasis will be placed on the processes that are used for rubber and rubberlike materials. A small amount of space will be devoted to the surface coating systems normally used on organosols or plastisol type materials.

Note from the Editor....

Both surface coating and impregnation are basic and important manufacturing operations in the ever-expanding rubber and coating industries. The author of the accompanying article has devoted his lifetime to developing new and improved equipment for these operations, and we are glad to be able to present in full the interesting material he has accumulated. The article, which is based on a talk given by the author before the New York Rubber Group on April 4, 1952, includes 53 separate illustrations and outlines broadly the general design considerations and application techniques of many types of coating machines for fabric surface coatings and saturating systems for fabric impregnation. Emphasis is placed on the processes used for rubber and rubberlike materials. Some data on systems normally used for organosols and plastisols is also included.

Basic Designs of Coating Machines

There are many different types of coating machines that have been designed and built for very many different operations. However, these many types divide themselves into several basic designs. We shall trace the development of the machine design from the simple original bar coater to the very elaborate and complicated multiweb coater.

Possibly the most elemental of all surface type coating units is the old style bar type coater shown in Fig. 1. Principally, it consisted of a back-up channel over which the fabric or paper horizontally passed. In between the upstanding edges of the channel was placed a vertical bar or rough coating knife. By the forward propulsion of the web over the channel toes and under the bar, the coating material, contained behind the coating bar, was deposited onto the surface of the fabric.

Many of these machines were in use some twenty or twenty-five years ago but gradually their number has been reduced by more modern roll and knife, or by the reverse roll or rotogravure type coaters, where economics indicated such improvement. This original method was quite deficient from the standpoint of its operating speed, its quality control and the amount of material which could be applied accurately without the strike-through of the coating mass through the fabric backing material.

As coating machine design technology and process requirement increased, the next step in the evolution of the coater was the simple knife coater of the type indicated in Fig. 2. Some relationship to the design of the

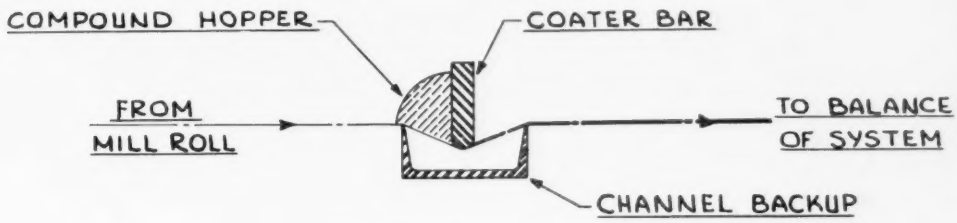


FIG. 1—Elemental scraper coater.

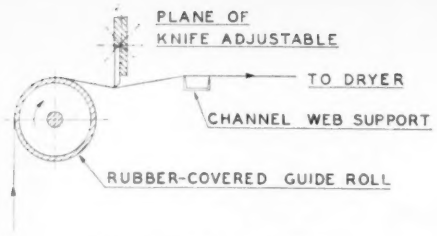


FIG. 2—Simple knife coater.

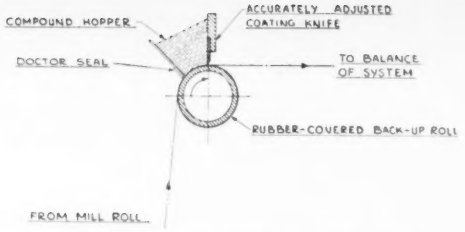


FIG. 4—Simple roll backed-up knife coater.

elemental coater conception will be noted. The material to be coated now passes over an idler guide roll then under the knife and thence over the upstanding toes of the back-up channel. By positioning the knife in between the roll and the channel and by adjusting the plane of the knife, both into and away from the direction of the fabric travel, control of the coating thickness becomes possible. There are still very many of these coaters in operation today but they, too, are gradually being superseded by more advanced types of coating machines.

In the forward evolution of the coating technique, it became necessary in many cases, especially with pyroxylin and some vinyl solutions, to apply two coats simultaneously or to apply one coat and further skim-knife or spit-knife the coating after it had been applied but before it had passed into the dryer or fuser unit. This particular coater with dual knife head (Fig. 3) is like the simple knife coater shown in Fig. 2 but two knives operate in tandem. With the flexibility of the knife blade rotation and a choice of knife blade contour, very accurate knife coating could be provided with these coating heads.

In any knife coater operation, the accuracy of the coating thickness, whether the compound be rubber or any coating material, is entirely dependent upon the smoothness of the drive and tension of the fabric. The uniformity of web speed and tension is an important requisite in knife coaters of any type. Notwithstanding, knife coaters, although outmoded in design by more modern types of reverse roll machines, are in operation in many plants producing decorative fabrics and other types of coated webs.

Developments in Knife Coaters

Perhaps the most common coating machine in use in the rubber industry today is the simple roll backed-up knife coater, such as commonly found on the hundreds of rubber spreading units in operation throughout the rubber industry. This type of spreader coater (Fig. 4) usually employs a rubber-covered back-up roll, a coating knife, and a small compound hopper.

In general, these coaters perform very well. However, with certain types of material, it is necessary that they be built so that the point of contact of the coating knife be adjustable with respect to the contact point at the back-up roll. This adjustment should be approximately one inch ahead of or in back of the centerline of the back-up roll. This is necessary when coating web materials which are not extensible and which may have characteristics such as wavy edges and/or baggy centers. By altering the knife position from the vertical centerline of the roll, uniformity of coating is possible, despite minor discrepancies in the web uniformity.

The control of coating thickness with most roll backed-up knife coaters of this type is done by gap setting between the back-up roll and the underside of the knife blade. However, in many spreading operations involving neoprene and solution rubber, especially where light gauge coating is required, pressure is applied to the knife so that the actual gap setting is somewhat less than the total thickness of fabric. The knife actually depresses the fabric.

Under these conditions, it is quite possible to apply as little as one-quarter ounce per square yard to heavy fabrics. These very light coatings are quite necessary in the spreading of balloon fabrics or life raft material or in any air impermeable rubberized fabrics. It is not uncommon that eight passes are made for each ounce per square yard of neoprene that is applied and four passes for each ounce of rubber. This low unit weight applies to any rubberized fabric in which the coating compound is to be used as an air- or water-tight fabric-reinforced diaphragm.

An example of the developments in the knife coater for special uses is shown in Fig. 5. This shows a metering knife coater used as a modified kiss coater on hot

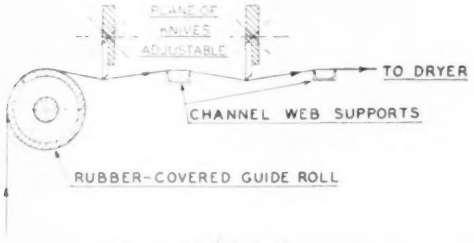


FIG. 3—Double knife coater.

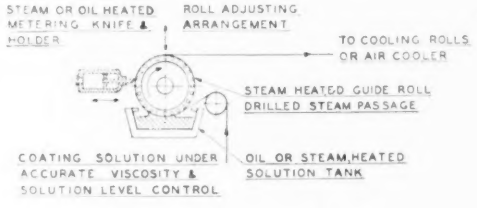


FIG. 5—Metering knife and modified kiss coater for hot melt.

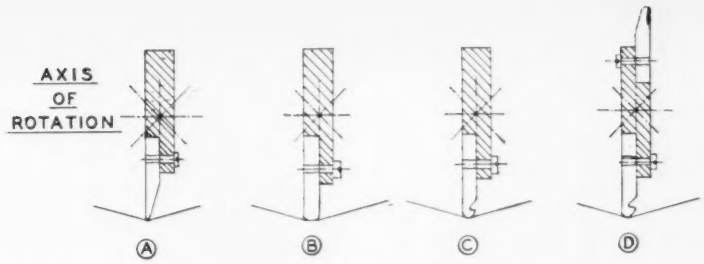


FIG. 6—Usual knife types. (A) Light coat—all fabric or paper types. (B) Heavy coat for second or final pass—all fabric or paper types. (C) Medium smoothing coat for final pass—all fabric or paper types. (D) Dual knife holder.

melt applications to paper or textiles. The amount of coating solution applied to the web is initially picked up by surface contact of the web with the heated coating solution in the pan. A steam- or oil-heated doctor blade is accurately positioned to provide the metering gap with respect to the material passing over the roll. Excess material is metered at this point and only that coating material that is required is allowed to pass through the gap setting. In this case, the back-up roll, the knife and the solution pan are all steam- or circulating oil-heated, depending upon the temperature required by the compound.

Design of the Knife Blade

In any knife coating operation, the coating quality and quantity is influenced by gap setting, viscosity of coating material, tension in the coated material, and the design of the knife blade. The design of four commonly used coating knives is indicated in Fig. 6, their applications being as follows:

Knife blade "A" is used for very light coats on all fabric and paper type materials. It is used for coatings averaging from 2 ounces down. By delineation of the knife into the fabric travel, it is possible to reduce the amount of coating and by delineating it in the direction of travel, it is possible to increase the amount of coating applied to the web.

Knife blade "B", which is a bull-nosed knife, has a machined edge of relatively large radius. It is used on very heavy fabrics requiring coatings with viscous materials or materials that tend to produce "fingers" behind the knife.

Knife edge "C" indicates a type of smoothing knife for very smooth coatings of vinyl or rubber on fabrics or papers. The relief on the downstream side of the knife is provided as a catch for any excess materials that might pass beneath the knife and tend to adhere to a downstream side of the blade where it will tend to build up and then drop off onto the freshly coated fabric.

Sketch "D" indicates a dual knife holder rotated about its axis and provided with a first coat or a light coat knife and a smoothing coat knife. This is a convenient feature allowing two styles of knife blade to be mounted on the main holder; thus, the changeover of the coater from one style of knife to the other is very easily and quickly accomplished.

Coating of rubber and rubberlike adhesive to paper sometimes presents a particular problem due to the variations in the knife coating head, the viscosity change in the rubber mass, and the extensibility of the solids in the wet film. A variation of the roll type knife and the straight knife coater is employed to overcome these operating disadvantages. The coater employs a large diameter stationery bar as the metering element and, in effect, is a very large diameter bull-nosed knife. One of the advantages of this machine is the fact that very small amounts of compound are exposed to air action because of the large diameter of the actual metering bar. Metering is done by gap setting and by accurate control of tension and velocity of the web. A diagrammatic drawing of this coater is shown in Fig. 7 while an actual unit is shown in Fig. 8.

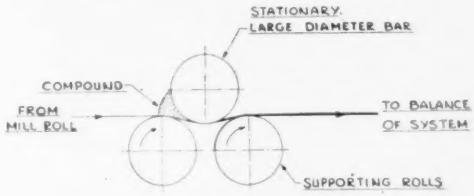


FIG. 7—Simple bar coater.

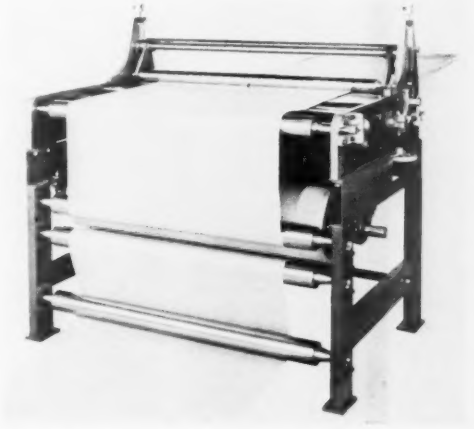


FIG. 8—Simple bar coater with back tension drive.

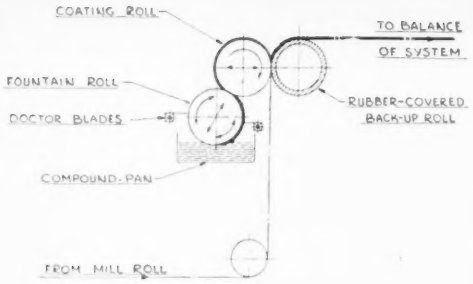


FIG. 9—Elemental roll arrangement of roller coater for low viscosity coatings.

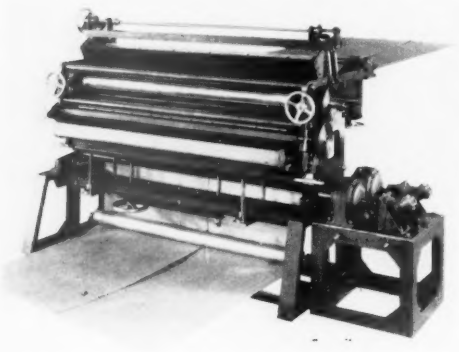


FIG. 10—Low solids coater showing pick-up pan and doctor blades.

Reverse Roll Coaters

Throughout the recent history of web coating, the tendency has been continually towards the use of the reverse roll coater. The reverse roll coater, as its name implies, is a coating machine utilizing a coating roll running in the opposite direction of the web. This roll then deposits a metered film of the coating compound onto the fabric or the paper that is being coated. Precise coating depositions can be effected with a very wide range of coating materials.

Continuously accurate and thin coating deposits can be applied by a reverse roll coater at relatively high speeds. Accordingly, the machine must be built with precision throughout. Roll deflection, bearing tolerances, side frame stability, and smoothness of drive must be determined and provided for in the design and machining of the unit.

If these design requirements are met, the coating machine will function as a piece of precision machinery, which it really is. Otherwise, the operation of the unit will not be as satisfactory as it should be. Likewise, care must be given to the selection of a machine which will suitably handle the coating material to be applied.

In the selection of the reverse roll coating equipment, the viscosity of the coating compound is an extremely important factor. If low viscosity material is to be applied, the application of the coating solutions to the web is done by the coating roll. The coating material is transferred from the compound pan to the fountain roll which, in turn, transfers it to the coating roll. Normally, three rolls are used in this type of machine.

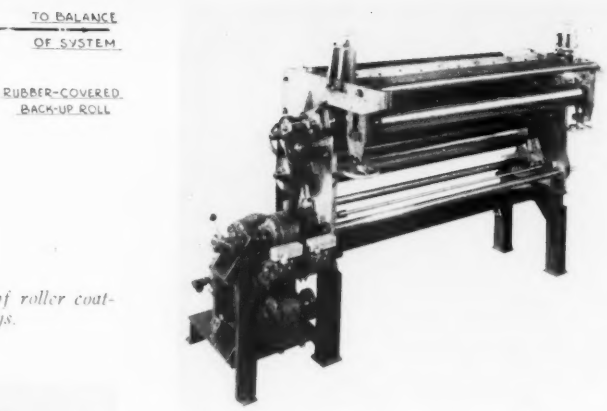


FIG. 12—Reverse roll coater with dual hydraulic drive.

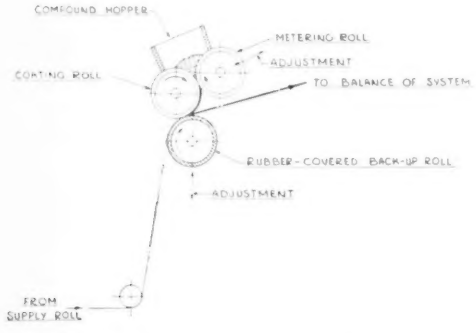


FIG. 11—Roll arrangement for high viscosity material.

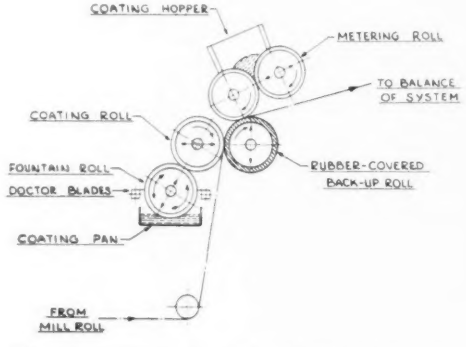


FIG. 13—Arrangement for high and low viscosity material.

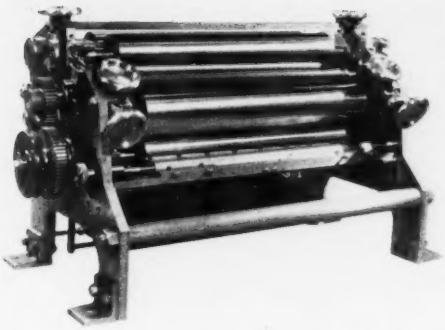


FIG. 14—Combination low and high solids coater.

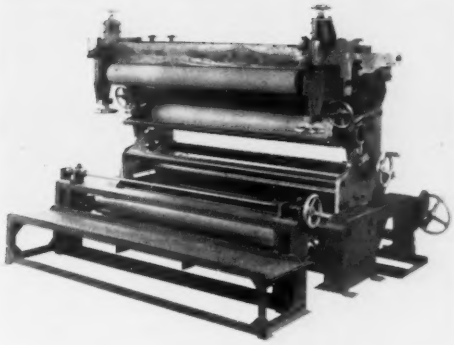


FIG. 15—Combination coater for knife coat, reverse roll, and solution coating.

The pick-up of compounds from the storage pan by the fountain roll is very accurately adjusted by machined metering or doctor blades. The material that is transferred from roll to roll is further metered by the gap setting between the two rolls. In some cases, these rolls are run in opposite directions and in other cases they are run in the same direction. In either case, the actual coating roll rotates in reverse direction of the fabric. Roll arrangements of a low viscosity roller coater are pictured in Fig. 9 while Fig. 10 shows an actual machine of this type.

If the coating that is to be applied to the web is of high viscosity, a coating roll arrangement of another design is usually employed. If the viscosity of the material is in the order of 15,000 centipoises and up, the roll arrangement which is indicated in Fig. 11 is used. The same three coating rolls are utilized but they are now arranged over the top of the fabric as it passes over the rubber-covered back-up roll.

In this coater roll arrangement, the coating is done in a somewhat different manner. In this case, the rolls are run in the same direction but at differential roll speeds. The material is metered through the gap between the rolls. The coating material is carried in the compound hopper which is mounted above the top two rolls. By adjustment of the speed differential between these rolls and the speed of the coating roll (all in relation to the fabric speed), and the gap setting between the coating and metering rolls, very accurate control of the coating application can be provided. Gap settings as low as .001-inch are in use today. These accurate gap settings

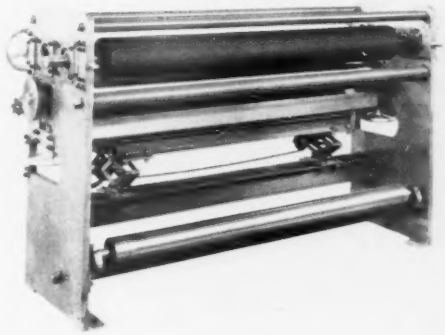


FIG. 16—Simple rotogravure top color coater.

indicate the need for very precise equipment design and manufacture to maintain accurate roll alignments and, therefor, coating thickness upon the web. In analogy, high viscosity reverse roll coaters are small three-roll friction calenders. This type of reverse roll coater is indicated in Fig. 12.

In some instances there are requirements for a reverse roll coater to apply both low and high viscosity materials

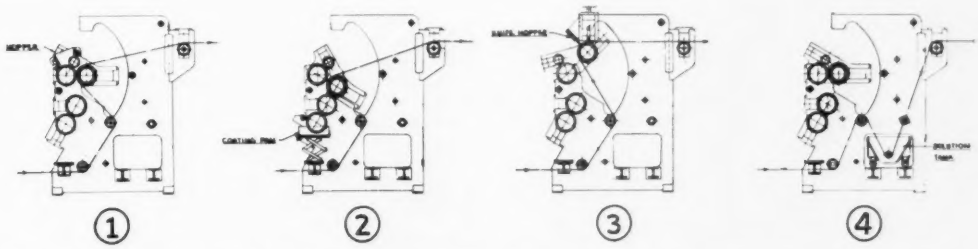


FIG. 17—Four element special coater. (1) Arrangement for reverse roll coating, head position horizontal. (2) Arrangement for rotogravure roll coating, head position lowered. (3) Arrangement for precision knife coating, head position raised. (4) Arrangement for dipping coat or impregnation, tank in position.

to the base fabric or paper. In such a case, coaters having five rolls are normally employed. The low viscosity roll arrangement, as illustrated in Fig. 9, and the high viscosity coating roll pair are used. The two metering roll pairs are grouped about the center back-up roll to give fabric travel. The thread-up is identical for each coating roll operation. A coater of this type has a roll arrangement as indicated in Fig. 13.

With the dual roll arrangement, it is possible for one complete reverse roller coater to handle surface coating compounds with a viscosity of approximately 1000 centipoises to approximately 100,000 centipoises on the same basic equipment. Fig. 14 shows such a coater.

Special Coating Operations

In some production coating operations there is often need for various other methods of coating. Where production requirements do not warrant the installation of separate coating systems for each type of coating, combination coating machines can be provided. Fig. 15 indicates a combination of a knife coater with roll back-up and unsupported knife coating, a high solids reverse roll coater, and a solution impregnating tank for latex or other preliminary first coat filling dips. A combination coating machine of this type will handle water-thin solutions for impregnation or initial sizing, solvent, and resin or rubber semi-fluid compounds to a viscosity range of approximately 18,000 centipoises. Heavily loaded and plasticized vinyl coatings to a viscosity range of 100,000 centipoises can also be run in the high viscosity roll group.

In the coating of papers for decorative or other uses, it is often necessary to apply the coating solutions by the rotogravure method. A simple rotogravure coater is shown in Fig. 16. Coaters of this kind are used for the application of various low viscosity coating solutions, usually at very low coating rates, to fabrics or papers. A rotogravure coater utilizes an etched rotogravure roll to pick up a known quantity of coating and deposit it on the web. The control of the deposit is effected by the depth and pattern of the etch. Usually, the deeper the pattern, the greater the amount that will be applied. Several basic types of etches are provided to suit fluid compounds of inks, glues, adhesives, resins and other fluids.

FIG. 18—Universal coater in rotogravure position.

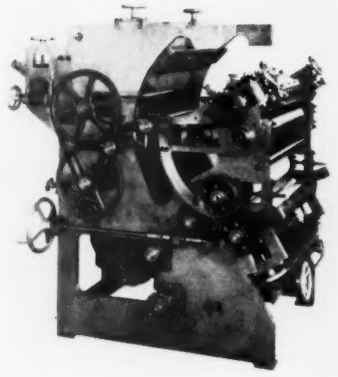


FIG. 19—Universal coater with sector in reverse roll position.

In some precision coating operations it is also necessary to reverse roll and/or knife coat initial coats prior to rotogravure coat. Fig. 17 indicates a machine with a combination of adjustable head facilities for performing rotogravure coating, reverse roll coating, knife coating and first coat impregnation. All of these coating elements are arranged on a gear sector which rotates about the back-up roll. This sector mounting is rotated in various positions to accommodate the rotogravure, the knife coating and/or reverse roll coating operations. The pass lines for various types of coating are shown in the illustration. Dipping is performed as shown.

Fig. 18 shows a machine with the sector in position for rotogravure coating. Note the position of the rotogravure roll in contact with the fountain roll with its doctor blades. Fig. 19 indicates the machine in position for reverse roll coating. The compound hopper can be seen at the very top of the roll stack. Note the position of the gear sector carrying the reverse roll arrangement.

In terms of the complete coating operation, the coating heads, a few types of which have just been described, are only one main component of the complete coating line. Other elements, such as evaporators or fusers, feed roll stands, embossing units, tension control devices, range drives and continuous take-ups make up the balance of the complete coating line.

(To Be Continued)

Gifford-Wood Co., Hudson, N. Y., has announced a newly-designed, fully-automatic **conveyor system for emptying up to 40 drums per hour.** The system comprises four principal units, including a totally enclosed automatic skip hoist, a transfer conveyor, an automatic drum washer, and a lowerator. It is reported to eliminate manual lifting, cut work-hours, provide dust-free emptying, and wash emptied drums.

Rolamarker 601, a new high-speed **manual device for marking** information of any kind on various materials, including rubber, whether in bar, tube, rod or sheet form, has been introduced by Adolph Gottscho, Inc., Hillside 5, N. J. The unit makes it possible to imprint a permanent legend 3/16ths of an inch deep by 8 inches long in a continuously repeated pattern.

Ultra-Fine Precipitated Calcium Carbonate as a "White Carbon Black"

By VICTOR H. VODRA

Wyandotte Chemicals Corporation, Wyandotte, Mich.

FOR over thirty years the rubber industry has been seeking a "white carbon black." Any compounder will give his assurance that a fortune awaits anyone discovering such a "black." He makes this assertion with a smile as if it were a nebulous, unattainable goal. But what would most compounders accept as a goal if it could be reached? They speak of carbon black as if it were a single product when, in reality, there are literally dozens of carbon blacks on the market—all different. These are loosely grouped into several classifications, each group doing some jobs better than any other. Thus, before a "white carbon black" can be developed, it might be well to try to define "black carbon black" in terms of properties that affect rubber.

Definition of Reinforcement

The first and foremost requirement of a carbon black is that it reinforce rubber. "To reinforce" literally means "to strengthen." Generally the term is connected with tire treads and applies to stiffening and improving the abrasion resistance of rubbers. Measuring sticks of reinforcement, such as "proof resilience," "energy capacity," "energy absorption" and "tensile product," have been used for fillers in natural rubbers. From some points of view, all blacks, except Medium Thermal, and even some mineral fillers, reinforce, yet because of poor resistance to tear and abrasion, many cannot be used for treads. Until GR-S came along the channel blacks reigned supreme and "heat build-up" was not considered. With the introduction of High Modulus Furnace blacks and subsequent improvements in these, products with lower "proof resilience" were found which gave better tire life—and ideas changed somewhat.

Let us consider some of the non-black fillers in new terms of reinforcement and see if any might fulfill some requirements for a "white carbon black." If strengthening rubber means increasing tensile strength, then the ultra-fine calcium carbonates and silicates, silica, magnesium carbonate, titanium dioxide and zinc oxide (to name a few) all reinforce. If stiffening rubber with small additions is reinforcement, then the silicas and calcium silicates do a good job. If improving tear resistance is reinforcement, then ultra-fine calcium carbonates and silicates, silica, zinc oxide and titanium dioxide are good. If abrasion resistance is a factor, again silica and calcium silicate might suffice. Many of these products far surpass many carbon blacks in their specialties.

Another criterion of reinforcement that has been offered is the effect of a filler on the solubility of rubber. If a filler so combines with rubber as to become permanently bound together and the rubber cannot be completely solvent extracted, that filler is said to reinforce the rubber. Under such an interpretation many ultra-fine, non-black fillers reinforce while large particle fillers do not.

The carbon black manufacturers have done an excellent job of familiarizing the compounder with the proper selection and use of blacks. No compounder today would substitute on an equal volume basis a thermal black for a channel black and expect the same results. Although particle size and surface area are not the entire reasons for differences obtained from fillers, they do exert the major influence. Today, if a compounder knows how a black is made and its particle size, he can predict with considerable accuracy the properties that it imparts to a rubber at any loading. He understands the dozens of blacks on the market today and uses them alone or in combination to gain the most and sacrifice the least. He knows also that to get the necessary dispersion to obtain the best physical properties from the ultra-fine particle carbon blacks he must use special techniques.

Carbon Black Versus Calcium Carbonates

But what does this same compounder expect of "white carbon black"? Generally, the expression implies one universal product, selling at a low price, to do the jobs of all the carbon blacks, and requiring no special processing techniques. Because of this feeling he tends to lump large families of mineral fillers into one group and to expect all of them to act as any one member would. Few realize that the *differences between the extremes of a non-black filler may far exceed the differences between the extremes of all the rubber grade carbon blacks.*

Table I—Relation Between Physical Properties of Extremes in Particle Sizes of Carbon Blacks and Calcium Carbonates

	In Natural Rubber		In GR-S	
	MPC ——— × 100 MT (%)	UF ——— × 100 GL (%)	MPC ——— × 100 MT (%)	UF ——— × 100 GL (%)
Particle size (volume)	.091	0.000004	.091	0.000004
Ultimate Tensile	130	155	225	700
300% Stress....	300	325	235	160
Ultimate Elongation ...	93	93	100	150
Shore Hardness.	136	110	125	100
Tear Resistance.	235	600	335	250
Flex Life	130	800	200	3750
Proof Resilience	130	155	260	175

Note: The subject matter of this article has been discussed by the author before various local rubber groups during the past year. The highlights of these talks are incorporated in the current material.

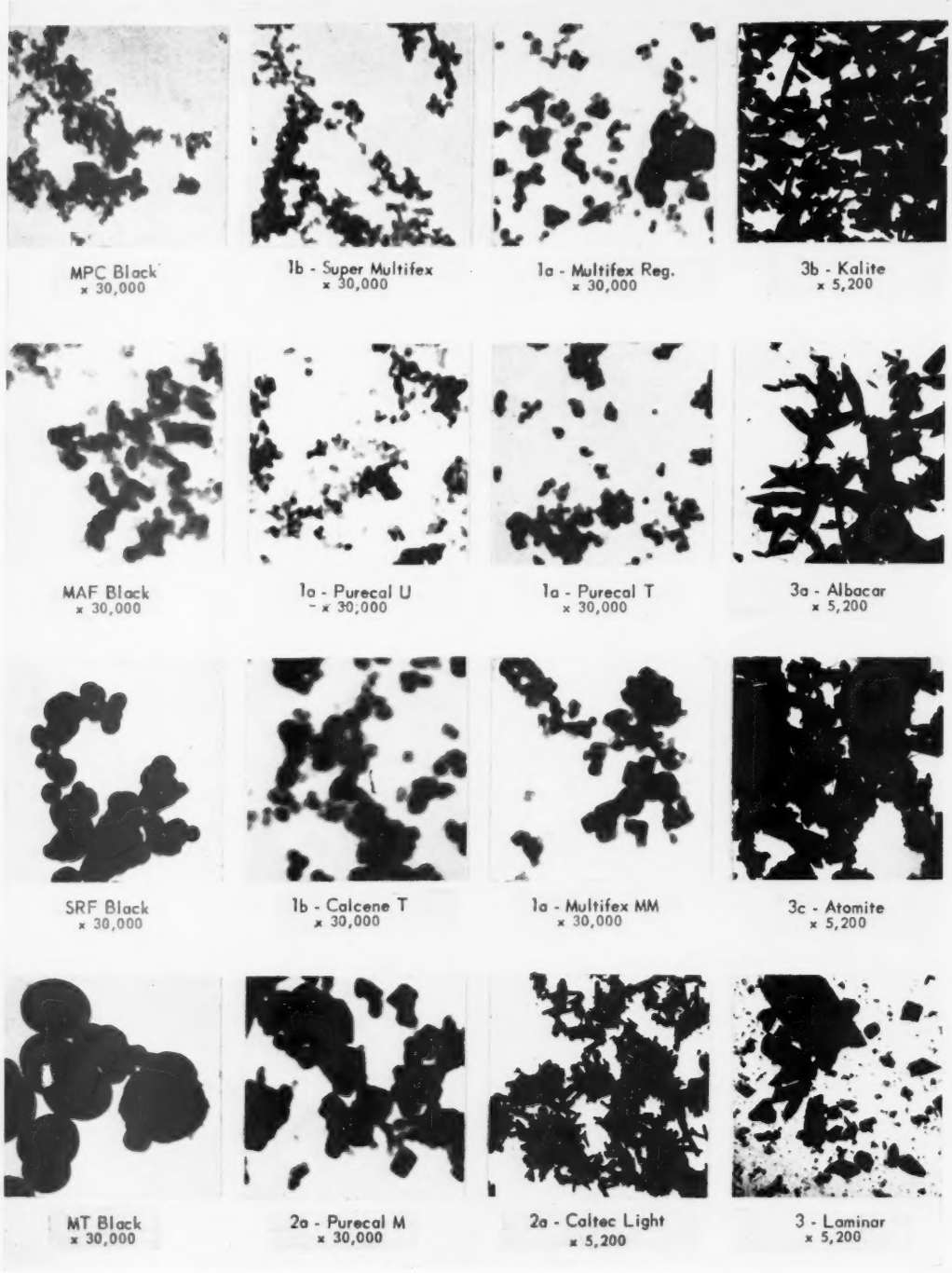


FIG. 1—Electron photomicrographs of black and non-black fillers.

Note: The code in front of each calcium carbonate shown indicates the particle size grouping, the method of manufacture, and whether it has been coated. The numbers indicate particle size, as follows: 1—Ultra-fine; 2—Fine; 3—Medium; 4—Large. The letters indicate the method of manufacture and whether or not coated, as follows: a—Precipitated; b—Precipitated—Coated; c—Water Ground; d—Dry Ground—Air Floated; e—Dry Ground.

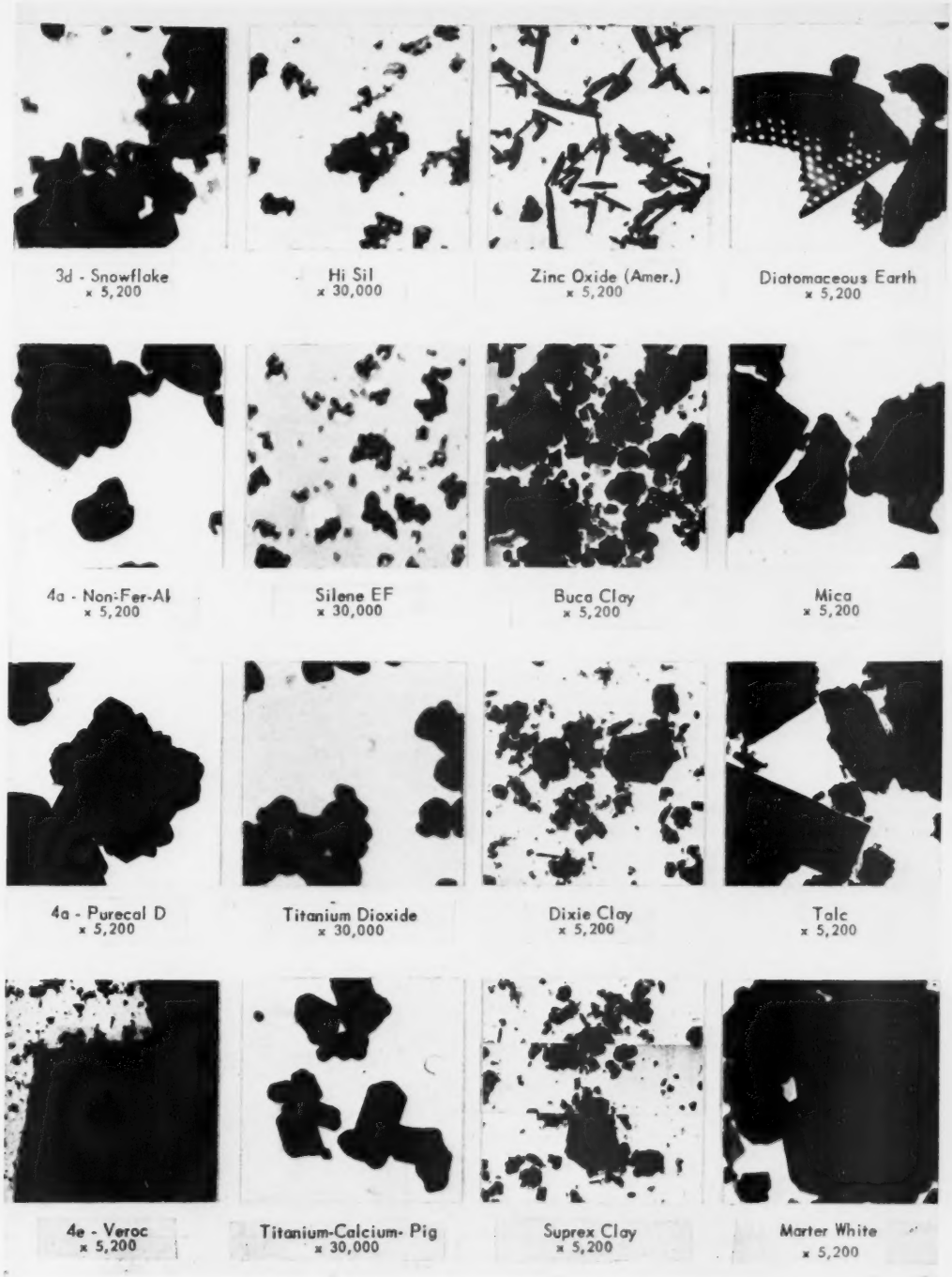


FIG. 2—Electron photomicrographs of black and non-black fillers.

Note: The code in front of each calcium carbonate shown indicates the particle size grouping, the method of manufacture, and whether it has been coated. The numbers indicate particle size, as follows: 1—Ultra-fine; 2—Fine; 3—Medium; 4—Large. The letters indicate the method of manufacture and whether or not coated, as follows: a—Precipitated; b—Precipitated—Coated; c—Water Ground; d—Dry Ground—Air Floated; e—Dry Ground.

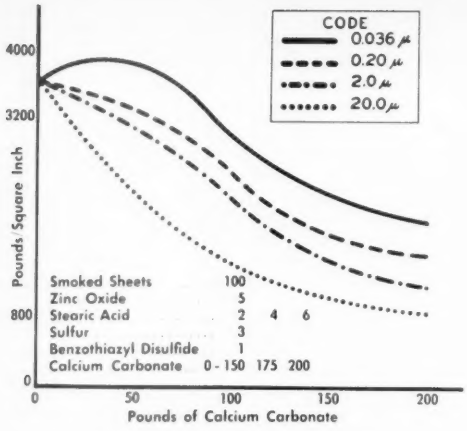


FIG. 3—Effect of particle size of calcium carbonates on the tensile properties of natural rubber.

These differences are accentuated in the photomicrographs of both black and non-black fillers shown in Figures 1 and 2. The differences between an MPC black (0.028 microns) and an MT black (0.274 microns) with the differences between an ultra-fine calcium carbonate (0.036 microns) and a ground limestone (over 10 microns) at equal volume loadings are compared in Table I. The data express in percent the ratio between the physical properties of a Medium Processing Channel and those of a Medium Thermal black in both natural rubber and GR-S. Similar data are presented for an ultra-fine precipitated calcium carbonate and a dry ground limestone. The comparisons are made at a 27.8 volume loading equal to 50 pounds of carbon black or 75 pounds of calcium carbonate.

There are fourteen major classifications of carbon blacks for the rubber industry, but only two for calcium carbonates. "Whiting" (limestone) and "Calcium Carbonate" are the only groups listed in glossaries, trade journal price lists, etc. Occasional filler studies in the literature will differentiate between ground limestone and precipitated products. Rarely are the terms "fine particle" or "ultra-fine" precipitated calcium carbonates used. The inference is that all members of these groups act alike. The fallacy of such thinking will be noted by studying carefully one group.

Differences in Calcium Carbonates

The average particle sizes of different precipitated calcium carbonates range from 0.028 to 10 microns. A quick comparison of the carbon blacks and calcium carbonates pictured in the electron photomicrographs in Figures 1 and 2 show that the ultra-fine and fine carbonates *alone* cover a range of particle sizes *nearly equal* to that of all the rubber carbons. The medium carbonates, whether precipitated or ground, range from roughly 1 to 3 microns, while the coarse products may contain particles well over 40 microns in diameter. Large particle ground chalks give physicals in rubber quite different from those obtained with the finest water-washed, ground whitings.

Because of their methods of manufacture, precipitated calcium carbonates usually have a much narrower range of particle sizes than ground whitings. It is impossible to grind, by any known commercial method, to the ultra-fine particle sizes possible by the precipitation methods. The average particle of the finest ground limestones still has a volume 6,000 to 125,000 times as great as the ultra-fine precipitated calcium carbonates. MT black is only 1170 times as large as HPC black—the two extremes in rubber carbon blacks.

Calcium carbonates made by the precipitating or grinding methods overlap in particle sizes, but extensive studies in natural rubber and GR-S show that calcium carbonates of similar particle sizes and surface areas impart similar tensile, tear and flex properties regardless of their methods of manufacture. Cubical, spherical or cigar-shaped carbonates all give similar properties at the same surface area.

It should be pointed out that no commercial calcium carbonate is 100% pure. Purity differs between brands. Most are only 95 to 99.5% calcium carbonate. The ½ to 4% impurities may tremendously influence the aging, color and discoloration characteristics, cure rates and stability in latices. Surface coatings are frequently

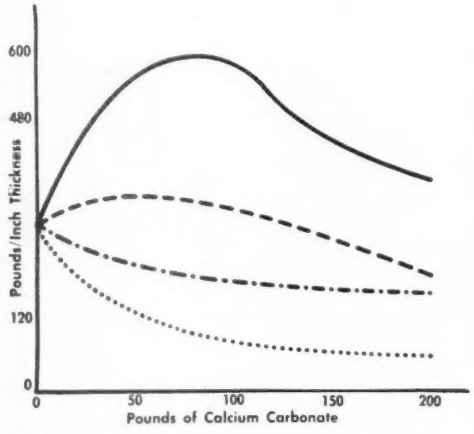


FIG. 4—Effect of particle size of calcium carbonates on the tear resistance of natural rubber.

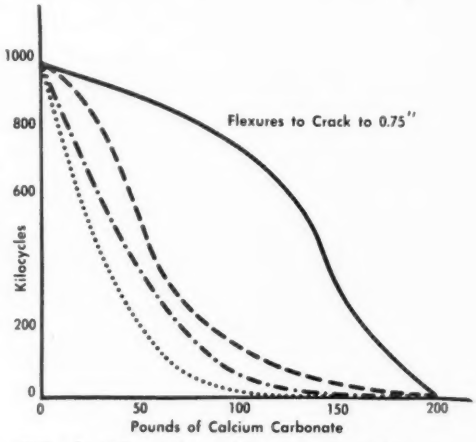


FIG. 5—Effect of particle size of calcium carbonates on the flex life of natural rubber.

added to many carbonates which further affect not only their processability but also how the fillers will test.

Coatings will not change the basic characteristics resulting from the particle size of the product, but can affect its curing rate, stiffness, permanent and compression sets, color, and aging.

Effect of Particle Size on Quality

Now let us consider the effect of particle size upon some physical properties in both natural rubber and GR-S. Figures 3, 4 and 5 compare tensile, tear and flex resistance, respectively, as the loadings of carbonates of different particle sizes are increased in a typical natural rubber stock, while Figures 6, 7 and 8 compare the same properties with similar loadings in a typical GR-S stock, using GR-S-50 as the elastomer. The test compounds are shown in Figure 3 (natural rubber) and Figure 6 (GR-S). The code for the curves is shown in Figure 3.

Except for the ultra-fine size where no carbonate is made as fine as 0.02 microns, the sizes are shown in ten-fold increments. It is quite obvious from a study of the charts that the results obtained from the different sizes are quite different. Other properties might also be selected which would prove equally revealing.

The effect of particle size on quality can quickly be grasped by a detailed study of the natural rubber tensile curves (Figure 3) as an example. At a given loading, 100 parts for example, as the particle size decreases the tensiles rise as follows: 1500 psi for 20 microns; 2240 psi for 2 microns; 2520 psi for 0.2 microns, and 3030 psi for 0.036 microns. At a given tensile, 2000 psi for example, the loadings in the same order are 63, 110, 123 and 193 pounds, respectively. Certainly the results obtained are very dependent upon the particle size.

In natural rubber, as the particle size decreases there is a definite lessening of the degradation of tensile as carbonate is added to the pure gum stock. In fact, when the size diminishes to 0.1 micron there is no loss in tensile strength with small loadings and the curve is found to parallel the abscissa of the graph. Carbonates with smaller particle sizes actually increase the tensiles. For this group—having a maximum particle size of 0.1 microns and which increase natural rubber tensiles—the name "ultra-fine" is suggested.

Each particle size group behaves differently from every other group, as can be seen from the charts. Ground limestones impart physical properties almost identical to those obtained with the best precipitated carbonates when both have the same particle size. It is recommended that names be assigned carbonates according to their particle sizes since their behavior is more dependent upon their size than on their method of manufacture. Compound development men could then predict finished test results with more accuracy than is now possible with our present system. Production men and purchasing agents would be better equipped to know what products could be substituted with the least change in physicals during times of shortages. Research work would take on greater meaning if members of different particle size groups were compared rather than using several members from the same group. General statements, such as are frequently made now and applying to only one or two groups and not to all carbonates, would be eliminated or made more accurate.

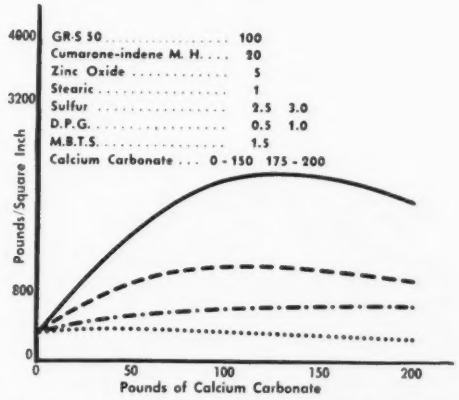


FIG. 6—Effect of particle size of calcium carbonates on the tensile properties of GR-S.

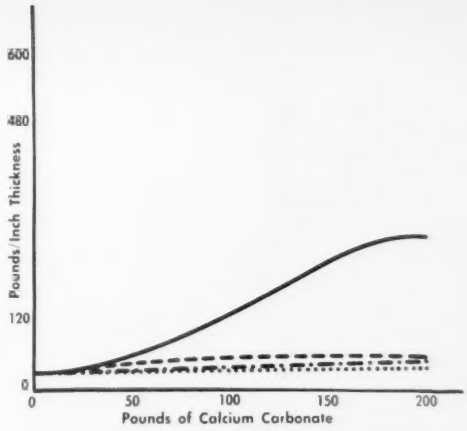


FIG. 7—Effect of particle size of calcium carbonates on the tear resistance of GR-S.

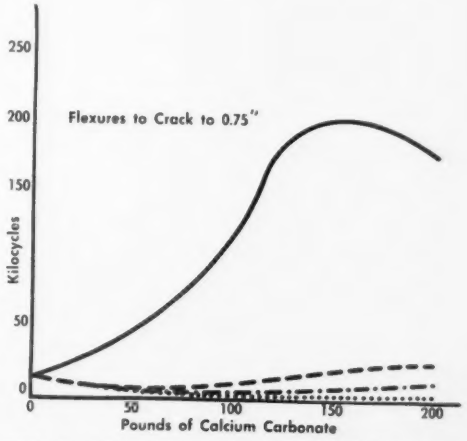


FIG. 8—Effect of particle size of calcium carbonates on the flex life of GR-S.

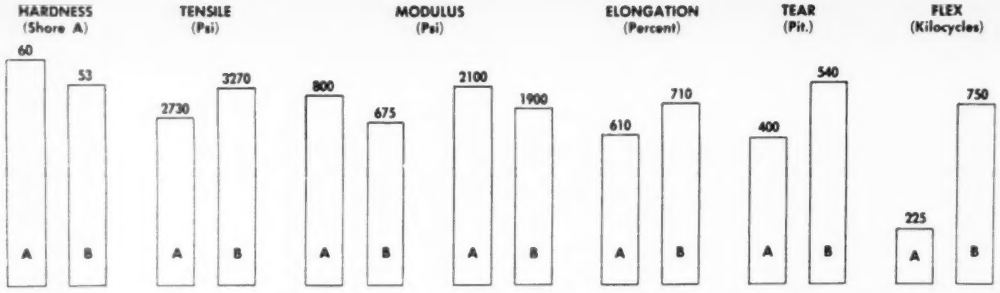


FIG. 9—Effect on quality of properly dispersing ultra-fine fillers. A—Purecal U added as a loose powder. B—Purecal U added in a 2:1 masterbatch.

Towards this goal then, the following suggestions for group names and particle sizes are offered:

Ultra-fine	Under 0.1 microns
Fine	0.1 to 1.0 microns
Medium	1.0 to 3.0 microns
Large	Over 3.0 microns

Quality and Dispersion

The need for properly dispersing channel blacks is well known. Tensile, flex life, abrasion and tear resistances, and, as recently proved, even the resistance to weathering and sun checking are better if the agglomerates are broken up and the black uniformly dispersed in the elastomer. Of equal importance is the need for correctly processing ultra-fine, non-black fillers. When the first large volume calcium silicates were introduced, it will be remembered that they were processed like large particle pigments. Results in soles, for example, showed a 10 to 25 point drop in hardness the first weeks the shoes were put into service. Today, by proper handling, this no longer happens.

Shore hardness has been directly used for over a decade to check the quality of some ultra-fine calcium carbonate stocks. With normal sulfur compounds in natural rubber, if the hardnesses resulting from ultra-fine carbonate loadings are not at least 5 points lower than those which would be found with medium or large particle carbonates, then the stock has not been properly processed nor the ultra-fine pigment well dispersed. This same stock will have an unduly high modulus, low tensile, low elongation, low tear resistance and low flex life as compared with the same stock properly processed. This is indicated by the results shown in Figure 9, and there is little doubt that aging, weathering and other characteristics are also affected. The data in Figure 9 are based on the following test formula:

Smoked Sheets	100.00
Reogen	1.00
Zinc Oxide	5.00
Stearic Acid	3.00
Santoflex BX	1.00
Sulfur	2.75
Altax	1.00
Thionex	0.05
Purecal U	100.00
Total	213.80

Carbonates are not all alike and require different processing techniques just as do carbon blacks. In natural rubber the Shore hardness is measured instantaneously as the drop or drift in hardness is very little as time passes. With most GR-S compounds, however, this drift is appreciable and the hardnesses measured 5 seconds and 30 seconds after the instantaneous reading are usually about 8 and 10 points lower, respectively.

Before discussing how the foregoing information may be properly put to use in practical compounding, it might be well to summarize the data presented to this point. The following factors have been established:

(1) No one "white carbon black" can be expected to fulfill all requirements any more than can one carbon black.

(2) There are greater differences between the non-black fillers than there are between all the rubber grade carbon blacks.

(3) There are greater differences in one classification alone, i.e., calcium carbonates, than there are between all the rubber carbon blacks.

(4) These differences must be recognized in research work as well as in practical compounding and the results obtained in testing one member of a group may be meaningless when applied to other members.

(5) Special processing techniques found to be required to obtain maximum physical properties from ultra-fine carbon blacks are equally important with ultra-fine non-black fillers.

(6) The classifications "Whiting," "Calcium Carbonates," "Ground Limestones" and "Precipitated Cal-

TABLE II—ULTRA-FINE PRECIPITATED CALCIUM CARBONATE VS MAF BLACK IN GR-S

	A	B	C	D
GR-S	100.0	100.0	100.0	100.0
Zinc Oxide	5.0	5.0	5.0	5.0
Stearic Acid	1.0	1.0	1.0	1.0
Sulfur	2.5	2.5	2.5	2.5
Altax	1.5	1.5	1.5	1.5
D.P.G.	0.5	0.5	0.5	0.5
Cumarone-indene Resin MH	—	—	20.0	20.0
MAF Black	—	30.0	30.0	—
Ultra-fine ppt $CaCO_3$	—	—	—	150.0
Totals	110.5	140.5	160.5	280.5
Volumes	111.22	127.88	145.5	185.5
Physical Properties (Cure: 20 minutes @ 287° F.)				
300% Stress	200	1900	1000	400
Tensile	300	2100	2280	2240
Elongation	350	315	500	750
Hardness	41	63	51	59
Tear Resistance	25	100	110	215
Flex Life	1000	1500	55,000	200,000

cium Carbonates" are too broad to have meaning. New classifications based on particle size, for example, "Ultra-Fine" (less than 0.1 microns), "Fine" (0.1 microns), "Medium" (1-3 microns) and "Large" (over 3 microns) would be a definite improvement.

Ultra-Fine Precipitated Calcium Carbonate

During the last war GR-S was thrust upon the rubber industry. Without sufficient time to do a thorough job of evaluating, many conclusions were reached, some of which were correct and some incorrect. Compounders could not be blamed for these, because they had only a meager background with synthetics which did not act like natural rubbers. They tried only loadings comparable to those used in natural rubbers and neoprene. Increasing those loadings (they thought) would undoubtedly ruin the tensiles, flex-life, tear resistance and other properties in GR-S, just as they do in natural rubbers. Equal volume loadings to various carbon blacks were tried with most non-black fillers and results were very poor. Out of this work came the thinking that with GR-S "any colored item could be made so long as it was black."

GR-S has low pure gum physical properties. It needs reinforcing by fillers or resins before anything worthwhile can be made from it. Compounding is done on a two-step basis. First, a quantity of reinforcing carbon black is added to impart strength (somewhat approaching pure gum natural rubber). Second, the curing agents, antioxidants and processing aids are added

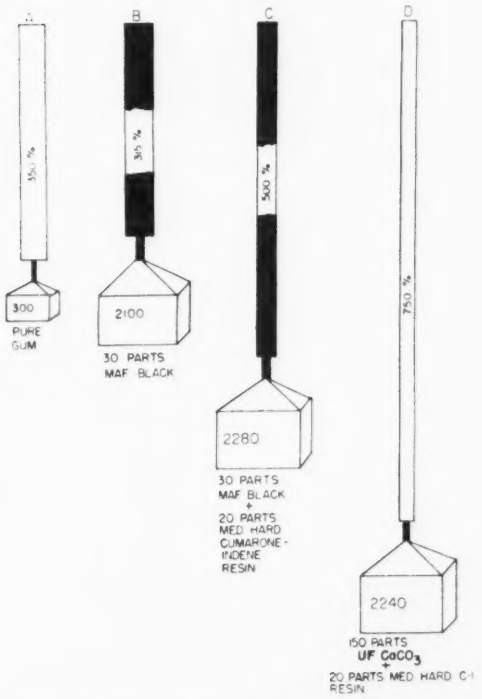


FIG. 10—Effect of ultra-fine precipitated calcium carbonate versus an MAF black on the tensile of GR-S stocks.

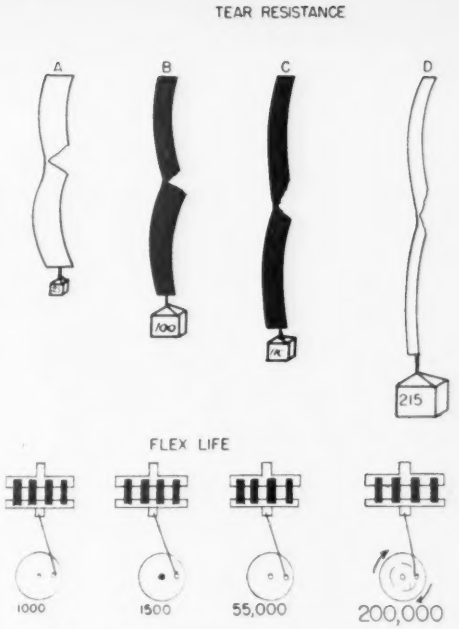


FIG. 11—Effect of ultra-fine precipitated calcium carbonate versus an MAF black on the tear resistance and flex life of GR-S stocks.

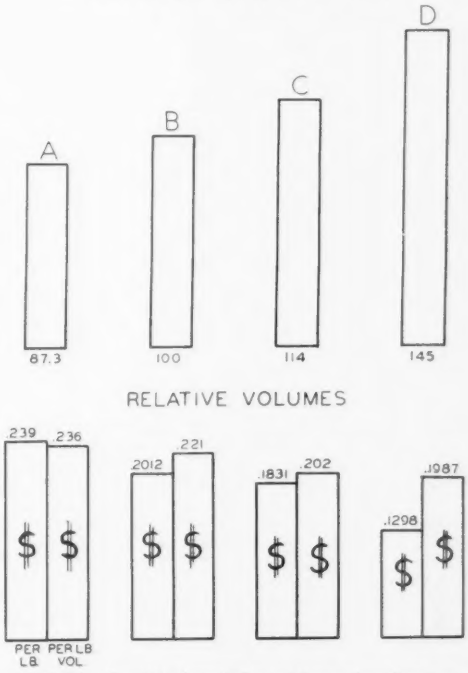


FIG. 12—Graphic description of how ultra-fine precipitated calcium carbonate extends GR-S and lowers costs.

along with softeners and fillers (even possibly more carbon blacks) until the desired properties, processing and costs are reached. The idea that this basic strengthening might also happen with high loadings of non-black fillers occurred to very few. Carbon blacks and quality appeared synonymous while the converse was true for non-blacks. If the customer had to have non-marking or colored goods, he was compelled to accept almost anything as the best possible with GR-S.

The fallacy of such thinking has since been established. A comparison between an MAF black and an ultra-fine precipitated calcium carbonate in strengthening GR-S is shown in Table II, with the data on tensile, tear resistance and flex life shown graphically in Figures 10 and 11. How ultra-fine precipitated calcium carbonate extends GR-S and lowers costs is indicated graphically in Figure 12. The compounds used in this instance are not necessarily finished stocks but represent the first step in building a GR-S compound. More of the same or other materials may be added to make the stocks desired.

Formula A shows the properties obtained from "pure gum" GR-S. Formula B shows how a black reinforces. An MAF black was selected as representative of what might be expected if a channel, HAF, MAF or HMF black were used to strengthen the GR-S. Because resinous materials improve the quality of non-black GR-S compounds, Formula C indicates what happens when the same amount of this resin is added to a GR-S carbon black base. Formula D shows the quality obtained by using ultra-fine precipitated calcium carbonate in place of the black in Formula C.

The advantages of substituting ultra-fine precipitated calcium carbonate for carbon blacks in the equal tensile stocks shown in Formulas B and D may be summarized as follows: (1) Extends GR-S 45% further; (2) Lowers pound volume cost; (3) Provides building tack; (4) Any color is possible, including black; (5) Better elongation; (6) Better tear resistance; (7) Better flex life. The MAF black advantages include higher modulus, better abrasion resistance and generally lower specific gravity.

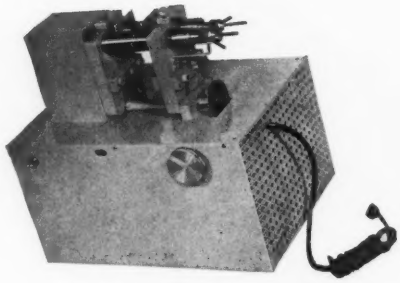
Laboratory Rubber Compound Mill

The new laboratory rubber compound mill currently being marketed by Ivan Sorvall, Inc., 210 Fifth Ave., New York 10, N. Y., which was designed by Dr. G. Goldfinger of the University of Buffalo, is capable of handling 0.5 to 10 grams of rubber samples plus the necessary compounding ingredients. Quantities as small as 0.1 gram of GR-S and 0.05 gram of carbon black have been successfully milled. Samples much larger than 10 grams of rubber and 5 grams of carbon black together with other fillers, softener, accelerator and sulfur cannot be successfully compounded. Up to three batches, compounded separately and totaling 50 grams, however, can be mixed to give a uniform product. Thus, this mill considerably extends the range of available equipment.

The cold rolled, case hardened, steel rolls are driven by a ⅓ horsepower gearhead motor. This provides such an excess of power that, even under the most strenuous conditions, the mill operates entirely noiselessly. The rolls are held in permanently lubricated friction bearings that require no attention. Two aluminum guides can be set by the setscrews at any desired distance. The construction is sufficiently rugged to permit milling off center, though this will lead to non-uniform wear, and therefore it is recommended that the guides be set equidistant from the middle of the rolls. Roll temperature is controlled by circulating water or any other non-corrosive liquid of the proper temperature through the rolls, each of which has independent inlet and outlet tubes.

The standard mill should not be steam heated. The roll distance can be varied by a single knob which drives an eccentric shaft through a worm gear assembly. This arrangement provides a convenient way to set any predetermined roll distance to an accuracy of much better than 0.1 mm. Though the small size of the mill makes an accident almost impossible, a magnetic brake is provided, activated by a switch and easily operated by the elbow or body. Since a conventional pan proved impractical, because of the small space available, a sheet of cardboard is slipped over the support beams.

The milling procedure on this mill is the same as on any conventional laboratory size mill. The person accustomed to larger mills will probably find at first that the milling cycle is longer than the one to which he is accustomed. Experience, however, will show that cycles equal and shorter than those on conventional mills can be achieved. This is particularly true for extremely tacky samples. Original breakdown of very tough samples is also easier and faster than on conventional mills.



View of the Sorval laboratory mill.

Graham Transmission, Inc., Milwaukee 12, Wisc., has added a new model to its line of **infinitely variable speed transmissions.** The new model, called Model 18, is designed for operation at 1800 rpm input without the use of auxiliary spring loading. The transmission is said to provide a wide speed range from any desired maximum to zero with hairline accuracy of speed holding and the ability to reset exactly to a desired speed.

A new type of **power operated valve,** available in six sizes and suitable for air, oil and water operation with option of finger, cam, toe or solenoid pilot controls, has been developed by Leeden Manufacturing Co., 1600 S. San Pedro St., Los Angeles 15, Calif.

Editorials . . . . . .

Case for the Reclaimers

AS REPORTED briefly in our previous issue, domestic manufacturers of reclaimed rubber requested and secured a hearing before the Senate Small Business Committee on June 5. The purpose of the hearing was to place the reclaimers on record with regard to the sale and distribution of all-purpose GR-S. As manufacturers of a comparable raw material, the reclaimers feel that they are being discriminated against by the fact that GR-S, which is produced, distributed and financed by a governmental agency, is sold at a price which does not carry the same full burden of costs as would be required if this material were made in privately-owned plants.

The purpose of the hearing has been misconstrued in many quarters of the rubber industry, probably because the full testimony was not given adequate distribution. Many have been heard to mutter that the reclaimers are seeking a governmental hand-out to bolster lagging profits. Others have insinuated that the reclaimers would like to see the price of GR-S pushed over 25 cents a pound, so that a more comfortable margin between selling prices of reclaims and GR-S elastomers would be established. It is no secret that consumption of reclaim has fallen off considerably in the first six months of the current year as compared with the last half of 1951, which has added fuel to the rumor fire.

Colloquially, these statements are "all wet." J. H. Nesbit, president of the U. S. Rubber Reclaiming Co., in his capacity as Chairman of the Executive Committee of the Rubber Reclaimers Association, made the position of the reclaimers quite clear during the hearing, when he stated that the rubber reclaiming industry "does not request a subsidy, required usage of its product, or special treatment." He made it equally clear that the reclaimers are quite willing to compete on equal terms with GR-S, providing a realistic price is established on that material which would reflect the actual costs of production and distribution.

Mr. Nesbit frankly pointed out that under the present system of determining the price at which GR-S is sold to the rubber industry it is impossible for the reclaimers to compete on equal terms. Because of this situation, the two following points were made, reflecting the feeling of the reclaiming industry: (1) Despite the fact that reclaimed rubber manufacturers are directly affected by the quantity and price of synthetic rubber produced by the Reconstruction Finance Corporation, no consideration has been given to the effect these policies will have on the reclaimed rubber industry; (2) The price of synthetic rubber should be calculated and sold to rubber manufacturers on the same basis as any private company would be forced to do if they expect to remain in business.

Like all factors in the over-all rubber manufacturing industry, the reclaimers recognize the necessity and importance of maintaining a strong synthetic rubber industry. Yet, in a definite sense, the production of reclaimed rubber is important to the maintenance of both civilian and military economy. If the reclaimers had not been able to jump in and fill the gap on rubber hydrocarbon availability which existed between the Japanese attack on Pearl Harbor and the mass production of GR-S there is no question that both our civilian and military machines would have been slowed down to a crawl, if they might not have broken down completely. The reclaimers expect no medals for the vital role they played at the time. They seek no special thanks from government or industry, either in the form of subsidies or price protection. But they do most aggressively desire free competition on equal terms.

Conversations with various reclaimers indicate that the industry as a whole is not too greatly concerned with the present fall-off in business. The industry has weathered the competition of other storms throughout its history. A glance at the record shows that the percentage of reclaim consumption to new rubber consumption has been maintained in a fairly steady line irrespective of the tremendous rise and fall in the price of natural rubber and the introduction of new materials, such as the synthetic rubbers. If the industry needed any moral support on this score it is to be found in the recent report of the President's Materials Policy Commission which predicted that consumption of reclaim by 1975 will amount to 800,000 long tons in the United States and 400,000 long tons in other free countries.

We do not intend at this time to go into a lengthy discussion of governmental accounting methods on which the price of GR-S is based. A good deal of the cost figures, or lack of them, were brought out at the hearing referred to herein. The point is that the reclaimers have been placed in an unenviable competitive position which merits correction.

NEWS OF THE MONTH

RUBBER ACT EXTENDED FOR TWENTY-ONE MONTHS REQUIRES RFC DISPOSAL PLAN BY MARCH 1, 1953

ON June 23 President Truman signed legislation to let the government continue to operate its war-built synthetic rubber plants until March 31, 1954—a 21-month extension of the present Rubber Act which was due to expire on June 30 of this year. The compromise bill signed by the President had been worked out by House-Senate conferees. The House previously had approved a two-year extension of the Act while the Senate had voted for a one-year extension. The new bill requires the Reconstruction Finance Corporation to report by March 1, 1953, to the President and Congress on a program to dispose of the $750,000,000 synthetic rubber industry. The President is required to put this in the form of legislative recommendations to Congress by April 15, 1953. RFC recently established industry working committees, under Special Deputy Administrator Morton E. Yohalem, to help draft "ground rules" to govern sales of the plants to private industry. Their work will help form the basis of the reports required by the bill.

June 30 also marked the end of government controls over the importation of natural rubber. The General Services Administration voluntarily surrendered its authority to act for all U. S. users in bringing rubber into the country. The withdrawal was in accord with the plan announced last February to assure an orderly return of the market to private hands.

Jess Larson, GSA Administrator, said that a final accounting of activity over the last 18 months—the program began on December 29, 1950, with the full cooperation of industry—will be forthcoming as soon as all the facts are in. He pointed out that some rubber is still afloat, having been purchased some time ago.

Explains Program Objectives

When GSA undertook the exclusive importation program the national stockpile of natural rubber was low and the world market price for the commodity was far too high, Mr. Larson explained. The objective was to raise rubber stocks to high levels and to bring about a price situation more in keeping with reality than the nearly 80¢ per pound that existed in December of 1950, he said.

Mr. Larson reported that the position of the rubber stockpile is good and the world price is much more reasonable. Through normal purchases for rotation it is hoped that this situation will continue, he declared. He also stated that the program bringing rubber into this country for immediate use by industry has been a self-supporting one. Any service which GSA performed for private companies has been paid by these companies. Lower prices have benefited everyone concerned, it was emphasized.

Earlier, on June 16, the private importation of natural rubber latex had been authorized by the National Production authority through an amendment to its Rubber Order M-2. E. D. Kelly, director of the NPA Rubber Division, explained that GSA had disposed of all government-owned stocks of such latex. When M-2 was amended on March 26, 1952, NPA said it would return importation rights of natural rubber latex to private hands when such stocks were dissipated.

GSA had been the exclusive purchaser of natural rubber latex since December, 1950. About mid-1951, the government decided to discontinue stockpiling and to dispose of its stocks. When M-2 was amended on December 14, 1951, private importers were permitted by GSA to apply for licenses to import natural rubber latex. The new amendment permits private importation without permission from either GSA or NPA.

With the end of GSA control over the importation of natural rubber, trading was resumed on the New York Commodity Exchange on July 1. The opening day cash price was 6¢ a pound below the government's last price of 38¢ a pound.

As for the huge stocks of natural rubber in the government's strategic stockpile, GSA made it clear that it will be August or later before it comes up with a firm rubber rotation program. Meanwhile, agency officials said, they have no intention of dumping vast tonnages of low grade rubber on the market in the immediate months ahead.

On July 1, GSA reverted to the Strategic and Critical Materials Act (Public Law 520), which requires it to replace any rubber sold out of the stockpile with new rubber on a pound for pound basis. The agency's officials say this law permits them to replace low grades with current imports of top grade rubber.

If it wanted to, GSA could embark on a program to drastically up-grade its rubber stockpile, which was, and probably still is, loaded with off-grade stocks unsuitable for stockpiling, trade sources say. But, as one official recently announced, the agency does not intend to take such action.

Far Eastern shippers—in some cases unwittingly—are reported to have shipped a great deal of off-grade rubber to the United States. Over 40% of the 500,000 long tons of natural rubber delivered to GSA last year was off-grade material. GSA officials indicate that they will not try to up-grade the stockpile. What they plan to do is to sell off the off-grade material, mostly browns and ambers, for replacement with the lowest "specification" grade of the same type. As an example, GSA will sell a No. 4 Amber for replacement with a grade 3 or 2 Amber.

The likelihood is that GSA will rotate not more than 20,000 to 35,000 tons of rubber over the six months ahead, probably requiring its replacement in 30 days.

Meanwhile, falling prices of natural rubber are causing genuine concern among rubber growers and the governments of producing countries in the Far East. If the present trend continues, adding unemployment to present difficulties, the present emergency could worsen rapidly, the Natural Rubber Bureau warns.

H. C. Bugbee, co-director of the organization, in a statement issued in Singapore, said that responsible Americans are fully aware of the relationship between natural rubber, the U. S. stockpile and the fight against communism. He said he knew that there was no official American intention to deliberately depress natural rubber prices. He feels certain that Americans will do all they can to encourage rubber prices that will contribute to Malaya's economy.

No Synthetic Price Cut

According to an announcement on June 26, the Reconstruction Finance Corporation plans to maintain its present selling price of 23¢ a pound for synthetic rubber. Mr. McDonald, RFC Administrator, said the decision was made after careful study. A cut in the government price for synthetic rubber has been rumored for some time in the rubber trade.

The move to cut the price was reportedly opposed by the U. S. State Department. Diplomats were worried over the price relationship between natural and synthetic rubber, considering the fact that the price of natural has been dropping steadily over the past few months. Far Eastern observers have blamed the drop on in-

creased U. S. production of synthetic. Any further cut in the price of synthetic, it was argued, would seriously affect Far Eastern economies.

It is reasoned in Akron trade circles that between the present and the time the Rubber Act expires on March 31, 1954, the government is going to look at synthetic rubber with a different "price eye" than it has in the past few years. It may seek to make the price reflect the actual cost-plus-reasonable-profit that would be necessary in selling the plants to private industry.

Based on government figures and those of corporations which operate the government-owned plants, synthetic rubber at 23c is not much over the cost of production. Government officials on several occasions have pleaded to have the price of GR-S better reflect the cost of producing it so that industry will know where it stands when the time comes. This plan is likely to be followed, say Akron rubber people, and the recent announcement that RFC does not plan to make any change in the price of GR-S is a reflection of this, they believe.

On July 1, RFC announced that it will keep in operation part of the Institute, West Va., synthetic plant, the highest cost of the 13 government-owned copolymer plants. This decision represents a reversal of an earlier announcement ordering the plant closed down and put in stand-by status effective July 1. That decision was protested by Senator Harley Kilgore (Dem., West Va.).

The Institute plant has been scheduled to produce only 2,500 long tons of synthetic rubber in July, less than half the 5,800 tons it produced in June. One of two production lines was shut down immediately and placed in stand-by for reactivation upon 90 days notice in event of emergency. At the height of the synthetic rubber program, the Institute plant was producing 9,000 tons of synthetic a month, all of it "hot" rubber based on high-cost alcohol-butadiene.

Other Shutdowns Ordered

RFC, on July 1, also ordered the immediate shutdown of the Louisville, Ky., alcohol-butadiene plant and one of the two production units at the Kobuta, Penna., alcohol-butadiene plant. Both plants have been the sole source of supply for the Institute facility. The agency did not announce how long the Institute plant will remain in operation. The Kobuta plant is scheduled for complete shutdown about September 1, Mr. McDonald said recently.

On approximately August 1, the Kentucky Synthetic Rubber Corp. at Louisville, Ky., will be ready for the final changeover which will permit the production of "cold" rubber. Most of the machinery and equipment needed for the changeover has already been delivered, while changes in the reactors to permit the use of ammonia for cooling cold rubber latex are well under way.

Looking ahead to 1955, the Defense Production Administration has set a goal of 1,210,000,000 pounds for the annual production of styrene, including methyl styrene. This goal represents an expansion of 584,000,000 pounds over the capacity of 626,000,000 pounds on January 1, 1951. It was pointed out by DPA officials that production of styrene rose from an insignificant amount in 1940 to approximately 720,000,000 pounds in 1951.

Of the 584,000,000-pound expansion program, 24,000,000 pounds will be provided through expansion of a government-owned plant, DPA stated. To date, tax amortization certificates have been issued with a total capacity of 326,000,000 pounds. In addition, certificates have been recommended for production capacity amounting to 231,800,000 pounds, leaving a balance of 2,000,000 pounds capacity yet to be provided.

Oil-Extended Polymers

In a memorandum issued on June 27, RFC stated that in its memorandum of March 10 it had advised that Circosol 2XH, Sundex 53, Shell SPX-97, Dutrex 20 and similar types of oil would be used interchangeably in the production of oil-rubber masterbatches. Since that time certain members of the industry have questioned the interchangeability of these oils and recommended that certain of them be incorporated in specific polymers. Inasmuch as this can be done without an increase in the number of polymers, RFC proposes to incorporate the indicated oils in the following polymers on an interchangeable basis:

OIL-MASTERBATCHES

GR-S 1700—Circosol 2XH or equivalent
GR-S 1701—Shell SPX-97 or Sundex 53 or equivalent
GR-S 1702—Shell SPX-97 or Sundex 53 or equivalent
X-706—Shell SPX-97 or Sundex 53 or equivalent
X-692—Shell SPX-97 or Sundex 53 or equivalent
X-693—Circosol 2XH or equivalent
X-682—Circosol 2XH or equivalent
X-709—Circosol 2XH or equivalent

OIL-MASTERBATCHES—PIGMENTED

GR-S 1800—Circosol 2XH or equivalent
X-691—Sundex 53 or Shell SPX-97 or equivalent
X-668—Sundex 53 or Shell SPX-97 or equivalent

Where the phrase Circosol 2XH or equivalent is used, the word equivalent means an oil meeting the Synthetic Rubber Division's specifications for naphthenic processing oils. Where the phrase Sundex 53 or Shell SPX 97 or equivalent is used, the word equivalent means an oil meeting the Synthetic Rubber Division's specifications for aromatic processing oils. In addition to the usual chemical and physical properties these specifications will require consumer approval based on factory processing evaluations, RFC indicated.

The processing oil incorporated in a polymer will be identified both on the quality report which accompanies each shipment and on the paper bags containing the rubber. In the case of bareback shipments of carbon black masterbatches, the identification will be embossed on the bale. The following codes of identification will be used and such letters will appear as a suffix to the polymer numbers: Circosol 2XH-C; Sundex 53-N; Shell SPX 97-L. In the case of oil black masterbatches, the first letter following the polymer number will indicate the oil incorporated, the second letter will indicate the carbon black, as stated in the RFC memorandum of April 22, 1952.

Big Shift to Synthetic

Other government agencies have also been looking into the future, and the President's Materials Policy Commission believes that the next 25 years will see a tremendous increase in free world synthetic rubber production to meet a world demand more than double that of 1950. At the same time, it held little hope for anything approaching a comparable expansion in the production of natural rubber. Natural, it believes, will hold its own, and a 25% expansion is the most the Commission is willing to forecast.

U. S. demand for new rubber, the Commission believes, will nearly double to 2,500,000 long tons by 1975 and the country has the raw materials to meet that demand entirely from synthetic rubber which could be marketed at current price levels and still return a normal profit to private manufacturers.

Free world demand outside the U. S. is expected to rise to 2,500,000 tons, about triple 1950 use, leaving a free world market of some 5,000,000 tons to be shared by natural and synthetic rubbers. The Commission believes that natural rubber will have about 2,300,000 of this market, compared with 1,500,000 in 1950. Synthetics will have 2,700,000, compared with its 625,000 ton share in 1950.

Production-wise, the Commission is of the opinion that the U. S. may be producing 2,000,000 tons of synthetic 25 years from now, or double current U. S. capacity. While both natural and synthetic rubber are being improved in quality, the Commission believes the improvement is coming faster for synthetic. Likewise, the economic factors are more favorable to synthetic rubber over the long run.

The Commission's doubts about the future ability of natural rubber producers to keep pace with expanding market demands

Lifts Butyl Export Ban

The Office of International Trade, on July 7, announced a third quarter export quota of 2,500 tons for Butyl rubber. Easing of the supply of Butyl now permits limited exports to be resumed after more than two years in which no Butyl was licensed for export, OIT said. Applications for licenses to export Butyl should be filed on the regular license application form. OIT said it will send each exporter whose application is approved an export license authorizing him to ship a specified quantity of Butyl. Receipt of the license will entitle the licensee to apply to RFC for a permit to purchase that quantity of Butyl from an RFC plant.

stem from two factors. For one, competing synthetic rubber will serve as a "lid" on natural rubber prices, dampening the incentive to undertake a major expansion program. Second, it takes seven years before new trees begin to yield rubber in commercial quantities. Almost all the rubber trees in the Far East are past their peak, and the necessary replanting is not going forward currently, the Commission stated.

Since labor costs and unstable political conditions are not expected to ease, the Commission doubts that much risk capital will be attracted to Asian rubber growing.

The Commission urges the early sale of the nearly 100% government-owned synthetic rubber industry to private firms and suggests that the building of additional plants over the coming years be accelerated in the interests of national security if it appears that no significant increase can also be expected in natural rubber output.

For statistical purposes, the Commission assumes that the Soviet bloc of nations will not increase its take of natural rubber beyond the 1950 level. It has the impression, however, that these countries will absorb a fairly large share of the additional natural rubber production foreseen for Southeast Asia over the next 25 years.

Production of reclaimed rubber is expected to reach 1,200,000 tons by 1975, including 800,000 tons in the U. S., nearly three times the 1950 output in this country. Thus, U. S. demand for rubber is projected at 3,300,000 tons, including 2,500,000 tons of new rubber, most of it synthetic.

Tires and other transportation items are expected to account for 1,600,000 tons, up 600,000 tons from the 1950 level. But, industrial rubber goods and other non-transportation items are expected to increase their share to 1,700,000 tons, nearly three times the 1950 level. Foam rubber in household applications is expected to share in this increase. The Commission projects 1975 demand at 119,000,000 passenger car tires and 40,000,000 truck and bus tires, compared with the 1950 demand of 83,000,000 passenger tires and 22,000,000 truck and bus tires.

Other News of Interest

The Office of Price Stabilization, on June 13, acted to restore the customary price uniformity among producers of polyvinyl chloride resins by permitting any producer whose GCPR ceiling price is less than 38c a pound to come up to this price. This action was taken in Supplementary Regulation 105 to GCPR, effective June 17.

OPS explained that its action amounted to an "in-line" adjustment for the one producer who failed to take the 2c per pound increase put into effect by the rest of the industry early in December, 1950. At that time this producer was operating on an experimental basis, but is now in regular production.

OPS has also indicated that it has delayed action on industry's efforts to suspend price ceilings on tires. The agency said that its Rubber, Chemicals and Drug Division has been unable to concur in the industry's petition for suspension because, at the present moment, the evidence available does not indicate the existence of a material softness in current tire prices at the manufacturing level. But, the agency said, the industry's petition is still being studied.

Policies and procedures for the establishment and operation of the Department of Defense duck and webbing pool by the Army Quartermaster Corps have been approved by the Munitions Board. Under this program, the Quartermaster General of the Army is assigned responsibility for administering and managing the pool to supply the current duck and webbing requirements of the Armed Forces. Administration and management functions will include control over pool inventories, stock levels, expenditure and reinvestment of pool funds, and distribution of items.

Plans to allocate domestic copper and issue "entitlements" to purchase foreign copper on a 60-40 ratio, were accepted on June 11 by the Wire and Cable Industry Advisory Committee at a meeting with the NPA. Under the plan, which becomes effective in July, NPA will allocate 60 percent domestic copper to the industry and issue entitlements to purchase 40 percent foreign copper. Each company will receive its due share of entitlement tickets, although not required to buy the foreign copper.

If a company does not elect to buy its monthly entitlement, it is not precluded from getting a new entitlement in the following or any succeeding month. However, the company will be expected to turn in its unused entitlement to NPA so another company can purchase the foreign copper.

The committee agreed that unused entitlements should be returned to NPA by the first of the month; that requests by industry for supplemental foreign entitlements also should be sent to NPA by the first of the month, and that NPA should fill any supplemental entitlement requests by the 10th of the month in order to give industry enough time to plan its production schedules. The committee also recommended the following:

(1) That the production directive issued by NPA be eliminated because it is of no relative value to industry regardless of the amount of copper available for production. In other words, production is dependent upon orders to be filled and copper made available to industry and not upon a production directive.

(2) That NPA appoint a task force to study a plan for the possible revision of the Controlled Materials Plan for copper, as more of this metal becomes available.

NPA agreed to take these two recommendations under consideration. NPA allocations to the industry for July approximate 127,444,000 pounds of copper, or approximately 76,466,000 pounds of domestic and 50,978,000 pounds of foreign copper.

NPA Redefines Sole Crepe

Sole crepe rubber now includes all grades of sole crepe as well as cuttings resulting from the trimming of slabs or sheets of sole crepe to size or shape according to Interpretation 2 of NPA Order M-2, effective June 19. The rubber order defines sole crepe as dry natural rubber produced from pale crepe which has not been compounded, vulcanized or physically attached to any manufactured product. In addition, the order prohibits the use of sole crepe in the manufacture of pneumatic tires, shoes, shoe soles, heels, welting or wrappers. The interpretation prohibits the use of sole crepe cuttings for such purposes.

Kellogg Expands Plastics Output

To meet increasing demands for military and industrial purposes, the M. W. Kellogg Co. has embarked on a program of expansion of its facilities for producing Kel-F, its fluorocarbon-type plastic. The new production facilities, representing an initial expenditure of about $1,000,000, are now under way at the Jersey City, N. J., development and manufacturing center of the company. The initial unit is scheduled to go into operation before the end of the year. Upon completion of the new plant, the current output of Kel-F will be increased to more than 1,000,000 pounds annually, with manufacturing economies which are expected to provide the basis for further price reduction. M. W. Kellogg will also extend its technical consulting and sales service to meet the growing requirements of Kel-F molders and end-users, and to further broaden its possibilities.

Carter Bell Car-Bel-Ex A

Carter Bell Manufacturing Co., Springfield, N. J., has introduced "Car-Bel-Ex A," a new vulcanized oil-type extender for natural and synthetic rubber. Low in cost, the product is said to be similar to high quality brown vulcanized oils in physical appearance and milling characteristics. Car-Bel-Ex A comes in cake form and has a specific gravity of 1.04 with an ash content of 0.5%. Hardness ranges from 15-25 while acetone extract is about 35%. When compounded with GR-S, Car-Bel-Ex A gives slightly harder stocks than conventional vulcanized oils and appreciably higher tensiles particularly at high concentrations. The product also finds use in compounding neoprene stocks where it is said to impart lower swell in aromatic oils.

Marbon Names Anchor Chemical

Marbon Corp., Gary, Ind., has announced the appointment of the Anchor Chemical Co., Ltd., Manchester, England, as exclusive world-wide distributors of their complete line of materials in all countries outside of the United States and Canada. Anchor Chemical has served as sole world-wide distributor for Marbon's "Ty-Ply" rubber-to-metal adhesive since September, 1950, and now assumes the additional distributorships of Marbon's high styrene resins, paint chips and paint resins.

ARMED FORCES HOLD INTERESTING RUBBER TESTING SYMPOSIUM

Rubber manufacturers who sell to various activities of the Army, Navy, and Air Force have long voiced their displeasure at the necessity for conforming to requirements in current military specifications which call for different low temperature methods and different apparatus for essentially the same rubber item. Since such a large proportion of rubber goods is presently being manufactured for the Armed Forces and since low temperature performance is often a prime requisite, a decided need exists for standardization of testing methods and apparatus.

Recognizing this need, Armed Forces engineers responsible for rubber materials met at the Pentagon on March 4 and 5, 1952, to discuss the possibilities for agreement on standard methods and test equipment for use in military procurement specifications of rubber items intended for low temperature applications. Irving Kahn, materials engineer in the Office of the Chief of Ordnance, Department of the Army, acted as chairman of the symposium.

Low Temperature Tests

As a result of the meeting, it was agreed that low temperature rubber tests and apparatus would be divided into four categories as follows:

1) *Brittleness*—The lowest limit of serviceability as determined by impact. *Test and/or Apparatus*—ASTM D746 (motor or solenoid actuated).

2) *Hardness*—Resistance to indentation. *Test and/or Apparatus*—Either the Pusey and Jones or the Admiralty dead load indentor type tester as specified in Federal Specification ZZ-R-601.

3) *Stiffness*—The degree of pliancy or ease of bending. *Test and/or Apparatus*—Gehman torsional stiffness.

4) *Elastic Recovery*—The force exerted by an elastomer to return to its original dimensions after deformation (an indication of crystallization on extended storage at low temperature). *Test and/or Apparatus*—Compression set, or temperature-retraction or tension recovery.

Work Already Completed

Some laboratory work has been completed using the apparatus chosen. Differences in test results have been observed between motor and solenoid actuated types of brittleness apparatus. Apparently, these differences are produced by variations in speed of impact. Although both the Pusey and Jones and Admiralty hardness testers are listed, tests indicate that the Pusey and Jones instrument does not operate satisfactorily at minus 65° F. Therefore, it is assumed that the trend will be toward the use of the Admiralty tester, the group decided.

The choice of the Gehman apparatus in preference to the Clash Berg for stiffness testing does in no way imply that the Gehman is the better instrument; actually both received an equal performance rating. The choice was made solely on the basis that the Gehman instrument was more generally available in government and private laboratories.

The changes in methods and apparatus from those currently specified in military specifications will occur gradually as the specifications are amended or revised. Thus, several years may elapse before the conversion to uniform test methods is accomplished. As an aid to suppliers who desire to retain their present apparatus, the cognizant Armed Forces activity exercising custodianship over a particular rubber specification will attempt to prepare interpolative charts from the present apparatus to the one agreed upon as the result of this symposium. However, in cases of disagreement, the apparatus and limits specified in the specification will be the primary standard.

The information presented at the symposium is intended to indicate the general trend of thinking of the military with regard to low temperature rubber tests and should be especially helpful to those Armed Forces suppliers who contemplate the purchase of new low temperature rubber test apparatus. It is to be emphasized that the agreements reached concern the type of apparatus only, and not test procedures such as conditioning times and test temperatures. These latter items vary with the individual Armed Forces activity and its particular end-item or service test requirements. In addition, for the same reason, no attempt was made to standardize on end-item tests. Further, it was not intended or implied that every military specification for rubber would contain all of the tests and apparatus or conversely no other tests than those described above.

It was decided that a similar symposium would be held annually to implement the decisions of this meeting and to attempt to reach agreements relevant to other rubber test apparatus and conditioning equipment. For purposes of future agenda, informal suggestions from interested activities are solicited.

Forms Sales Service Department

American Cyanamid Co., New York, N. Y., has announced the formation of a Sales Service Department for its Industrial Chemicals Division. It was explained that the move is in conjunction with a reorganization program, which has already consolidated various functions in the district offices. The new department will provide trade records, sales analysis, and complete order processing for the division's main office in New York. R. C. Sarfaty has been appointed manager of the new department. He formerly served as product supervisor for the Heavy Chemicals Department of the Industrial Chemicals Division. A graduate of Princeton University in 1943, he joined Cyanamid in 1945.

ADAMSON-UNITED COMPLETES GIANT VULCANIZER FOR GOODYEAR

The photograph above depicts the giant vulcanizer being moved through the streets of Akron on special dollies to the Goodyear plant.

Adamson-United Co., Akron, Ohio, has announced the completion of one of the largest vulcanizers ever constructed. The giant pressure vessel, measuring more than 45 feet in length and 15 feet in diameter, and weighing better than 150,000 pounds, was delivered to the Goodyear Tire & Rubber Co. to be used in the production of airplane fuel cells of all sizes. The shell was built under sub-contract in the shops of the Biggs Boiler Works, while the work on the door flanges and the door itself, weighing 47,000 pounds, was done in the Adamson-United plant. The vulcanizer is designed and built to stand an internal pressure of 100 pounds per square inch. Thickness of the tank shell is 1-1/16 inches and the thickness of the head is 1⅛ inches. The vulcanizer was subjected to hydrostatic tests requiring more than 65,000 gallons of water, weighing 273 tons, before it was delivered. The door is a slide-type, operating vertically in a tower with an over-all height of 35 feet. This type of door is designed to operate on a tongue and groove principle, one half of the door being grooved, the lower half acting as a tongue. The shell flange is likewise machined, but in reverse, so that when the door is lowered into closed position, tongues and grooves interlock, with clearance between door and shell flange sealed by the action of a rubber gasket. The vulcanizer will be housed in a newly-constructed building at Goodyear.

SYMPOSIUM ON EVALUATION OF NATURAL RUBBER FEATURES ASTM MEETING

Committee D-11 on Rubber and Rubber-like Materials of the American Society for Testing Materials had an active role in the Fiftieth Anniversary Meeting of the parent society which was held at the Hotel Statler in New York City the week of June 23. Official attendance at the meeting, which featured innumerable special events, exceeded 2600. An overflow crowd attended the 50th Anniversary Dinner, held on the evening of June 25, at which Detlev W. Bronk, president of Johns Hopkins University and also the National Academy of Sciences, was the principal speaker.

Dr. Harold Lee Maxwell, supervisor of mechanical engineering consultants for E. I. du Pont de Nemours & Co., Inc., was elected president of the society for the 1952-1953 season, succeding T. S. Fuller, engineer in charge of the Works Laboratory of the General Electric Co. Mr. Fuller continues on the board of directors as past-president for a three-year period. Norman L. Mochel, manager of metallurgical engineering for the Westinghouse Electric Corp., was elected vice-president of the society.

Activities of Committee D-11 during the week included well-attended meetings of seventeen separate subcommittees, a special symposium, and an anniversary dinner marking the fortieth year of the committee. In addition to the subcommittee meetings, at which several changes in existing specifications were discussed, an open meeting of the SAE-ASTM Technical Committee on Automotive Rubber, of which Dr. H. A. Winkelmann (Dryden Rubber) is chairman, was also held. At least three special sections of this committee also held meetings during the week. Full reports on all of these meetings will be published in an early issue.

The symposium sponsored by Committee D-11 was on "Recent Developments in the Evaluation of Natural Rubber," and included seven papers and a special report on methods for the determination of dirt in natural rubbers. Held on Thursday afternoon, June 26, during one of the year's worst heat spells, it attracted an audience of approximately 125 members and guests. The symposium was opened by Simon Collier (Johns-Manville), D-11 chairman, who gave some of the background concerning the establishment of Subcommittee XII on Crude Natural Rubber, and then turned the meeting over to Norman Bekkedahl (National Bureau of Standards), chairman of the subcommittee, who acted as chairman of the symposium.

Natural Rubber Quality

In a brief address, Mr. Bekkedahl discussed some of the methods used for determining the quality of natural rubber, and traced the efforts made to date by both the French and the British to grade rubber. He also explained the markings used in the Far East on the established grades.

Titles and authors of the papers presented at the symposium, abstracts of which were published in our May, 1952, issue, and some of which will be published in full in subsequent issues, included the following:

Technical Classification of Crude Natural Rubber, by R. G. Newton, International Rubber Research Board, London, England. (Presented by Dr. L. Mullin).

Mooney Viscosity Measurements of Technically Classified Rubbers, by Rolla H. Taylor, U. S. Department of Agriculture, Salinas, Calif., and A. G. Veith, B. F. Goodrich Co., Akron, Ohio. (Presented by Mr. Veith).

Technically Classified Rubber: The Non-Rubber Content and the Measurement of Cure Rate, by A. G. Veith, B. F. Goodrich Co., Akron, Ohio.

Vulcanization Characteristics of Natural Rubbers, by Robert D. Stiehler and Frank L. Rother, National Bureau of Standards, Washington, D. C. (Presented by Dr. Stiehler).

Quantitative Procedures for the Determination of Dirt in Crude Natural Rubber. (Presented by C. O. Miserentino, of the Dunlop Tire & Rubber Corp., Buffalo, N. Y., as a report of a special section of Subcommittee XII).

Preparation of a Standard Natural Rubber, by E. M. McColm, U. S. Rubber Co., New York, N. Y.

Some Aspects of the Testing of Natural Rubber, by Leslie V. Cooper, Firestone Tire & Rubber Co., Akron, Ohio. (Presented by T. M. Kersker).

Rubber Evaluations with an Instron Tester, by S. D. Gehman and R. P. Clifford, Goodyear Tire & Rubber Co., Akron, Ohio. (Presented by Dr. Gehman).

All eight papers presented at the symposium will be available in booklet form some time in September or October. Inquiries should be addressed to Paul Smith, American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Penna.

Business Meeting Held

The Annual Meeting of Committee D-11 was held on Friday morning, June 27. After the minutes of the previous meeting were approved, the biennial election of officers was held. John Allen (Firestone), chairman of the Nominating Committee, proposed that the incumbent officers and all members of the current Advisory Committee be reelected, which met the unanimous approval of those present. The officers include Mr. Collier as chairman and Arthur W. Carpenter (Goodrich) as secretary. The reports of subcommittee chairmen were then read.

Mr. Collier then advised that a letter had been received from Committee D-9 on Electrical Insulating Materials inquiring as to jurisdiction over the silicone rubbers and it was decided to ask the Society to give D-11 such jurisdiction. A motion was also made and carried that an official delegate be approved to represent D-11 at the meeting of the International Organization of Standards (ISO) in Paris next year.

It was also brought out during the business session that the Subcommittee on Nomenclature, headed by Harry L. Fisher (Reconstruction Finance Corporation), was making some progress with its work, and it was suggested that this group offer some 50 to 100 suggestions at a time to D-11 for discussion, rather than wait until a more-or-less complete nomenclature for rubber was compiled. It was also suggested that some liaison between the subcommittee and the Rubber Manufacturers Association, which is also working on rubber nomenclature, might be worked out.

Still another suggestion advanced at the meeting was that a new subcommittee on research might be organized to prepare a general papers session at each of the D-11 meetings. It was decided to refer the suggestion to the Advisory Committee for consideration.

Fortieth Anniversary Dinner

A special dinner was held by Committee D-11 on Thursday evening, June 26, to celebrate the fortieth anniversary of the committee, with Mr. Collier presiding. tended the dinner, including T. S. Fuller and Paul J. Smith, of the ASTM staff. Mr. Fuller congratulated the committee on its considerable achievements to date.

A brief history of the committee was then outlined by Mr. Carpenter, who stated that although the records indicated the first meeting on standardization of specifications for rubber products was held on February 24, 1911, authorization by the society for the establishment of Committee D-11 was given on January 6, 1912. Four men were responsible for organizing the committee: Dr. W. C. Geer, then chief chemist of the B. F. Goodrich Co., and now a consulting technologist; C. D. Young, then a testing engineer for the Pennsylvania Railroad; E. A. Barrier, then an engineer with the Associated Factory Mutual Insurance Co., and John R. Freeman, a consulting engineer. Messrs. Young and Barrier are now in retirement, while Mr. Freeman passed on some time ago.

Mr. Carpenter also revealed that eight subcommittees were initially established by D-11, four of which are still going strong, namely, those on belting, hose, packing and insulated wire. He also stated that some of the initial specifications, although somewhat modified, are still on the books.

The group was very fortunate in having one of the original founders present at the dinner. This was Mr. Young, who in the interim had served in the military and became a Brigadier General, and who retired a few years ago as vice-president of the Pennsylvania Railroad. General Young was a classmate of Dr. Geer at Cornell University, and although the latter had hoped to attend the dinner he was not able to make it. A letter of regret from Dr. Geer was read.

General Young, who served during World War II as Deputy Director of the Office of Defense Transportation, told of some of the specification difficulties where rubber was concerned at the time that D-11 came into existence, particularly where the railroad field was concerned. For example, he stated that air brake hose usually lasted about nine months, although railroad engineers insisted it could be made with a 36-month guarantee. He also talked about some of the trials and tribulations of the bus and truck industry with tires in the 1942-44 period.

WORKER PRODUCTIVITY FACTOR IN CURRENT WAGE NEGOTIATIONS

The United Rubber Workers, C. I. O., now engaged in negotiations with members of the "Big Four" is reportedly pegging its demands for higher wages on three points: (1) the increase in the cost of living since October 15, 1951; (2) the increase in the annual productivity of the workers; and (3) the increase in company profits. The union is said to be demanding that the companies agree to the productivity factor in negotiating wages. This factor has given annual wage boosts to automobile workers which have been approved by the Wage Stabilization Board.

The WSB is now considering arguments on the productivity angle of considering pay raises. If approved by the board, then the union will insist it be part of labor-management contracts. The plan has been part of the collective bargaining pacts in the auto industry for several years. Observers point out that the rubber workers have received about all they can get under the WSB's present formula for granting increases. Union officials, however, said they will be entitled to more if the government's cost of living index shows an increase since October 15.

The Executive Board of the URW, meeting recently in Spooner, Wisc., also appealed to the rubber industry to voluntarily re-open pension, health and welfare agreements. The board has outlined a five-point program for local union negotiators to follow in their talks with company officials. This program calls for the following:

(1) Full payment by the employers for health and welfare programs for the workers and their dependents.

(2) Hospitalization, surgical and medical benefits to retired workers and their dependents.

(3) Higher pensions for all retired workers "to meet the increased needs" because of higher living costs.

(4) Life, sickness and accident insurance for employees with special attention given to obtaining semi-private accommodations and unlimited coverage for hospital extras.

(5) This program to be financed entirely by the employer.

L. S. Buckmaster, president of the URW, explained that the union decided on this action after the WSB recognized insurance premiums and contributions to pension funds as "non-inflationary." Rubber company officials are expected to give the union an emphatic "no" to these requests. They explain that insurance programs are costly and that they have no desire at this time to boost these benefits, especially since competition in the industry has forced them to cut prices on some products, particularly truck tires.

Ducros Named Sales Agents

Ducros and Co., 2860 East 130th St., Cleveland 20, Ohio, has been named Cleveland sales representatives for A. Gross & Co., Newark, N. J., and Harry T. Campbell Sons' Corp., Baltimore, Md. Both firms were previously represented in the Cleveland area by the firm of Smead & Small, Inc.

ACUSHNET PROCESS ANNOUNCES PROMOTION OF YOUNG AND WEAVER

Richard B. Young

Thomas C. Weaver

Acushnet Process Co., New Bedford, Mass., has announced two executive changes of interest. Richard B. Young, formerly factory manager of the Rubber Division, has been named assistant sales manager of the division. Thomas C. Weaver, previously assistant factory manager, has been appointed factory manager succeeding Mr. Young. Mr. Young joined Acushnet Process in 1938 after graduating from the Massachusetts Institute of Technology with a B.S. degree in mechanical engineering. After considerable time in both engineering and production positions, he was named chief engineer of the Engineering Division. Later, he was promoted to plant superintendent. For the past six years he has been factory manager. Recently, Mr. Young completed the Advanced Management Program of the Harvard University Graduate School of Business Administration. Mr. Weaver began his rubber career after graduation from the University of Akron in 1937 with a B.S. degree in mechanical engineering. For two and one-half years, he worked with the Goodyear Engineering Squadron and for an equal time with the Production Squadron of that organization. He then joined the Sinclair-Collins Valve Co. as sales manager. In 1942, Mr. Weaver joined Acushnet Process. From the position of chief engineer at the company he went to the position of technical superintendent. Later, he was appointed to the post of assistant factory manager.

Hi-Sil Price Reduction

Columbia-Southern Chemical Corp., a subsidiary of the Pittsburgh Plate Glass Co., has announced a second major price reduction in its fine particle silica pigment "Hi-Sil." The new price schedule, effective June 16, applies to all domestic contract and spot sales. In carloads or 20,000 pound truckloads, the product now sells for 10c a pound. In shipments of 1,000 to 19,999 pounds, Hi-Sil sells for 11c per pound. Shipments under 1,000 pounds are sold at 11½c a pound. Shipments are packed in 25 pound multi-wall bags, f.o.b. Barberton, Ohio.

Felt Products Building Plant

Felt Products Manufacturing Co., Chicago, Ill., has broken ground for a new 84,000 square foot factory in Skokie, Ill. The factory is one of two to be built on 375,000 square feet of land. The company intends to add a 75,000 square foot factory in the future to house the balance of its manufacturing operations and its offices. At present, the office and some manufacturing facilities will remain in Chicago. Felt Products manufactures mechanical goods, including aircraft and automotive specialties, packings, rings, seals, etc.

Standardization Research Plan

A Fellowship for conducting systematic studies of standardization and its applications in science, engineering, production and marketing has been announced by Dr. Edward R. Weidlein, president of the Mellon Institute, Pittsburgh, Penna. This Fellowship will be sustained at the Institute by a grant from the Sarah Mellon Scaife Foundation of Pittsburgh, and its projects will be organized and supervised by Dr. Dickson Reck, Advisory Fellow. Dr. Reck will work in cooperation with research specialists of the Institute and with national authorities and societies.

New Plasticizers Bulk Station

A new plasticizers bulk station has been established by the Monsanto Chemical Co. at Perth Amboy, N. J. The station, located to service the New York area by compartment tank truck, is the company's third. Other bulk stations are at Everett, Mass., and St. Louis, Mo. A fourth will shortly be opened at Akron, Ohio. Purpose of the bulk stations, company officials said, is to enable plasticizers users to buy more than one of the company's wide range of plasticizers at the same time for compounding versatility, and at tank truck prices.

SEMINARS ON NATURAL RUBBER SPONSORED BY RMA COMMITTEE

A special program is being launched by the Crude Rubber Committee of the Rubber Manufacturers Association, headed by W. J. Sears, to assist rubber manufacturers throughout the United States to get what they pay for in buying natural rubber. The members of this committee, according to Mr. Sears, are convinced that a substantial majority of American rubber manufacturers are paying higher prices for their rubber than is warranted by the quality of the rubber which is delivered to them.

In a letter to the industry, the RMA Crude Rubber Committee has pointed out that natural rubber of a fraction to a full grade off quality is delivered as "something better than it is." This results primarily, according to the committee, from a lack of knowledge concerning contractural rights, standard samples, and proper inspection. Since the larger firms maintain trained inspection staffs, the additional costs of poor grading and packing and the penalties of poor inspection are borne by and large by the smaller manufacturer.

At the recent meeting of the International Rubber Study Group at Ottawa, Canada, the RMA unveiled a special exhibit of RMA type samples, which was greeted with considerable enthusiasm. It has now been decided to place this exhibit on national tour, reaching geographic centers accessible to approximately 1,000 rubber manufacturers. In connection with the exhibit, members of the RMA Crude Rubber Committee will be on hand to present papers on various aspects of quality, packing, type samples, and contracts. In addition, experienced New York dock inspectors will travel with the exhibit to demonstrate methods and to assist manufacturers and their agents in this field with their specific problems.

The following tentative schedule has been worked out for the presentation of the exhibit and the seminars:

Akron—September 16-17
Trenton—Sept. 30-Oct. 1
New York—October 14-15
Boston—October 21-22
Chicago—November 18-19
Los Angeles—December 2-3

Some changes may occur in the above schedule, and rubber manufacturers who have not received direct communications from the RMA with regard to the exhibit and seminars should contact W. J. Sears Rubber Manufacturers Association, 1832 M St., N.W., Washington 6, D. C.

DuPont Opens Houston Office

On July 1, the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., opened a sales office in Houston, Texas, under R. W. Malcolmson. Mr. Malcolmson will cover the Southwest, handling sales and technical service for neoprene and the company's rubber chemicals. After his graduation from Columbia University, Mr. Malcolmson spent five years with the Goodyear Tire & Rubber Co. He joined DuPont in 1947 and has been engaged primarily in neoprene sales development.

Vinylfilm in Flood Control

Goodyear Vinylfilm, fabricated into long blankets by the Boland Manufacturing Co. of Winona, Minn., was pressed into service along the banks of the rapidly rising Upper Mississippi River recently when it was feared that the swift current would wash away the sand bag barricades. As the angry river churned to its crest, it battered at the plastic protected sand bags without success. When the flood had subsided, the Vinylfilm blankets were cleaned of mud, rolled up and placed in storage in case of future emergencies.

Join Williams Research Staff

C. K. Williams & Co. has announced the appointment of two assistant directors of research, Irwin C. Clare atnd Mark Hoffman. Mr. Clare was graduated from Tufts College with a B. S. degree in chemistry in 1922 and received his M. S. from the University of Maryland in 1924. For 15 years he was associated with the Hercules Powder Co., Wilmington, Del., part of the time as head of the Evaluation Division of the Experiment Station. During the past 3 years he has been chief of the Paint Section of the Research Laboratory of C. K. Williams. In his new position, Mr. Clare will supervise research on the application of pigments in rubber, paints, plastics, floor coverings, and allied lines. Mr. Hoffman received his B. S. degree in chemical engineering from Lafayette College in 1933, and since that time has been in the Production Department of C. K. Williams. He has worked as an analytical and testing chemist and has been in charge of both quality and production control. More recently, he has been assistant plant superintendent and chief plant chemist. Mr. Hoffman will now have charge of the Optical and Physical Laboratories as well as the Chemical Engineering Section of the Research Department, engaged in developing new products and processes.

Plan 7th Chemical Exposition

The Seventh National Chemical Exposition to be held in the Coliseum in Chicago, Ill., on September 9 to 13 will feature an exhibit on atomic energy staged under the sponsorship of the Chicago Section of the American Chemical Society. The exhibit will be tied in with a series of papers by leaders in the field discussing various aspects of atomic energy in industry. The central unit of the exhibit will be a new working model of an atomic pile in which non-radioactive material can be irradiated. A model of a complete atomic power plant to utilize the heat from the reactor will also be shown. Third major item in the show will be a model isotope separator, required to make fission products available in suitable forms for industrial use.

CONSIDERS MUTUALLY RECOGNIZED DIPLOMAS IN RUBBER TECHNOLOGY

Representatives of 8 Western European countries met on June 30 at the Rubber-Stichting in Delft, Holland, to discuss further plans for establishing mutually recognized diplomas in rubber technology on an international basis. The participating countries included Denmark, France, Germany, Great Britain, Netherlands, Norway, Sweden and Switzerland. A representative from Indonesia attended the meeting as an observer.

Preliminary agreement was reached at previous meetings regarding requirements to bring national diplomas into line with the Licentiateship Diploma of the Institution of the Rubber Industry. Means of maintaining the examination standards in various countries were also discussed at the meeting. The fundamental idea underlying the discussion was that each country would bestow its own diploma which would represent the same standard of attainment as that of the IRI. Some countries were reported to have made a start with their training program plans.

Some of the delegates felt that the situation was less favorable in their countries and that it might take a little longer to begin with their training programs. In France, the situation appeared to be somewhat different in that a suitable training program has been in operation for a number of years. This system is recognized by the French government so that changes will be more difficult. Means will be discussed, however, to incorporate the new project into existing arrangements.

No Stock Interest in U. S.

Our attention has been called to an error in an item which appeared in our May, 1952, issue. In a news story referring to the deposition filed by Irenee du Pont which denied the anti-trust charges made by the Federal Government against E. I. du Pont de Nemours & Co., Inc., and others, it was stated that the DuPont organization bought into General Motors in 1917 and into U. S. Rubber in 1927. The facts are that the DuPont Company did acquire and still has an interest in the General Motors Corporation, but the company did not acquire and does not now have any stock interest in the U. S. Rubber Co. Mr. Irenee du Pont and others, including other members of the DuPont family, did acquire and still have an interest in the latter company. We are glad to set the record straight on this point.

Offer New Chemical Literature

The Intermediate & Rubber Chemicals Department, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has begun publication of a series of pamphlets under the title of "Calco Rubber Chem Lines." The pamphlets, which will be devoted to a discussion of the applications of the company's various rubber chemicals and compounding ingredients, will be issued from time to time. Copies can be secured on request to the Bound Brook headquarters.

EAGLE-PICHER OFFERS $8,125,000 FOR OHIO RUBBER COMMON STOCK

Eagle-Picher Co., Cincinnati, Ohio, has made a cash offer to purchase all of the common stock of the Ohio Rubber Co. for $8,125,000. Ohio Rubber, whose origin dates back to 1873, is a leading manufacturer of molded rubber goods and produces a wide variety of molded and extruded rubber goods for the automotive, farm equipment and toy industries. In addition, the company is presently engaged in making tank tracks in substantial volume for the defense effort. Its plants are located at Willoughby, Ohio; Conneautville, Penna.; and Long Beach, Calif.

Capitalization of the Ohio Rubber Co. consists of $1,837,500 of funded debt, $1,915,900 of preferred stock and 250,000 shares of common stock. Eagle-Picher has options to purchase approximately 200,000 shares of the Ohio Rubber common stock at $32.50 a share and has agreed to offer the same terms to the holders of the remainder of the outstanding stock. Eagle-Picher reserves the right to withdraw its offer unless a minimum of 225,000 shares is deposited for sale under the purchase offer. Ohio Rubber will continue to operate under its present management.

Net sales of the Ohio Rubber Co. for the fiscal year ended September 30, 1951 were $32,740,000 compared with $22,819,000 for the preceding fiscal year. Net income before taxes amounted to $5,465,000 in 1951 and to $3,641,000 in 1950; net income after taxes was $1,824,000 and $2,184,000, respectively. Unaudited statements for the eight months ended May 31, 1952 show net sales of $19,454,000 and net income after taxes of $781,000. Operations from October 23, 1951 through February 26, 1952 were hampered by a strike in the company's plants at Willoughby and Conneautville; a related strike affected the California plant for a shorter period.

General Tire Personnel Changes

General Tire & Rubber Co. has announced a series of personnel changes within its organization. Robert Rehm, formerly manager of quality control for the company, has been named production manager of the Akron plant. He has been associated with the company since 1949. William S. McCormick, Jr., formerly a production engineer, succeeds Mr. Rehm as manager of quality control. Mr. McCormick began at General Tire in 1950. William Yurkowsky, Jr., previously associated with the Goodyear Tire & Rubber Co., has been appointed manager of quality control at the General Tire plant in Waco, Texas. James A. Rankin has been named to succeed Mr. McCormick as production manager for passenger tires in the Technical Department. In other personnel changes, A. R. Carr, formerly manager of Kraft system and special product sales, was promoted to manager of passenger tire sales. Mr. Carr joined General Tire in 1945. J. A. Beckett, previously manager of construction and contractor tire sales, has been appointed manager of Kraft system sales. Mr. Beckett has been with General Tire since 1928.

PORTRAIT OF DR. SPENCE UNVEILED AT UNIVERSITY OF SOUTHERN CALIFORNIA

The dedication of the David Spence Rubber Technology Library on June 3 at the University of Southern California featured the unveiling of a portrait of Dr. Spence, who recently donated his extensive library to the TLARGI Rubber Technology Foundation. Shown above, in the usual order, are the participants in the unveiling ceremony: Fred D. Fagg, Jr., president of the University; R. D. Abbott, representing the Los Angeles Rubber Group; Mrs. William F. Russell, Dr. Spence's daughter, and her husband, a member of the faculty of Pomona College.

British Cable Industry Cited

A British government commission has charged that Britain's electric wire and cable industry is a monopoly and recommended that price-fixing arrangements and bidding agreements should be ended since they restrict competition. The commission found that two trade associations were responsible for about 80% of cable production. These two groups—the Cable Makers Association and the Covered Conductors Association—"conduct their affairs so as to prevent or restrict competition." This is contrary to the public interest, the report said. The report condemned the industry's system for sewing up bids and dealing out contracts, with resulting higher prices to the consumer. The associations have said their set-up includes minimum standards and a high level of quality. The commission was set up in 1948 under the Labor Government. Britain has no anti-trust legislation. The government can act on the commission's reports by passing specific anti-monopoly laws or by calling on the accused industry to make a change.

Ziegler Buys Utah Gilsonite

G. S. Ziegler, general manager of G. S. Ziegler & Co., New York, N. Y., has purchased the Utah Gilsonite Co. of St. Louis, Mo. The purchase includes the name, good will, mining properties, stocks, machinery, equipment and trade marks. The mines involved are located in the Uintah basin of Utah. Mining operations will be continued on a much larger scale under the new management, Mr. Ziegler said.

Tire Prices Cut 2½ to 7½%

Effective with the close of business on June 12, the Goodyear Tire & Rubber Co. announced that lower list prices were in effect on most of its types and sizes of truck tires. These reductions ranged from 2½% on small truck tires to 7½% on the larger sizes. All automobile and truck tubes were reduced by 5% and prices for farm tractor tubes were reduced 7½%. Most major tire producers follow the Goodyear action and instituted similar price cuts. Seiberling, Firestone, Lee Tire, Mansfield, General Tire, and Mohawk have already announced similar price cuts, and it is expected that other producers will shortly institute similar price cuts. In making the announcements, major rubber firms said the cuts reflect some of the savings made possible because of lower natural rubber prices. Passenger car and farm tractor prices were not changed because these casings contain from 75 to 85% synthetic rubber. For the same reason the price cuts were less in the smaller sizes of truck tires because they contain less natural than the larger units.

Dewey & Almy $3,500,000 Loan

Dewey & Almy Chemical Co., Cambridge, Mass., in accordance with the plan described in the annual report for 1951, has signed agreements with the Massachusetts Mutual Life Insurance Co. and the New England Mutual Life Insurance Co. to borrow $3,500,000. Of this sum, $2,500,000 will be taken immediately, while the balance will be taken later in the year. The loan is at 4% for a period of fifteen years.

NO. CALIF. HEARS COLLIER ON MODERN QUALITY CONTROL

The June 5th meeting of the Northern California Rubber Group held at the Elks Club in Berkeley, Calif., was addressed by Simon Collier, director of quality control for the Johns-Manville Corp. Mr. Collier spoke on "Modern Quality Control". In his address the speaker noted that during the war years the necessity of using many substitutes tended toward a lowering in quality standards. As a result, customers are now more critical and are demanding more quality than is really necessary. Industry, he said, is currently faced with this problem, and should take corrective steps.

Mr. Collier observed that Johns-Manville is fully aware of this situation and has taken definite action. They have instituted an extensive training program designed to teach the most modern techniques of quality control to their production and inspection personnel. A part of the training program is a sound color film outlining the basic principles of statistical quality control. This film was undertaken because of the past success in training employees by means of audio-visual devices.

It should be stressed, said the speaker, that no quality control program can succeed without proper planning. It is also necessary to sell the program to the production and engineering groups.

Buys German Pigment Firm

National Lead Co. has announced the outright purchase of Titangesellschaft m.b.H. of Leverkusen, Germany. Negotiations began shortly after World War II and were recently completed. National Lead had a 50% interest in the German company and bought the remaining stock from I. G. Farbenindustrie. The German firm makes titanium dioxide pigments in a plant claimed to be the largest of its type in Europe. Sales will be handled by National Lead's subsidiaries in Norway, France, Belgium and the Netherlands. The majority of the titanium dioxide pigments produced at the plant will go to paint manufacturers, with lesser amounts going to the rubber, paper and ceramics industries. Erik Anker, managing director of Titan Co. A/S, a National Lead subsidiary, will supervise over-all operations. Dr. F. Raspe, who has been plant manager since pre-World War II days, will be in charge of operations at Leverkusen.

Honor Paid to Drakeley

Dr. T. J. Drakeley, principal of the Northern Polytechnic and director of the National College of Rubber Technology in England, was among those receiving the C.B.E. award listed in the Queen's Birthday Honours. Since starting rubber classes at Northern Polytechnic some 30 years ago, which eventually led to the establishment of the National College of Rubber Technology, Dr. Drakeley has been closely allied to educational efforts in the rubber field, and his many American friends are pleased with the special honor bestowed upon him.

Coming Events in the Rubber Industry

July 22. Buffalo Rubber Group, Outing, Transit Valley Country Club, Buffalo, N. Y.

July 25. Chicago Rubber Group, St. Andrews Golf Club, Chicago, Ill.

Aug. 5. New York Rubber Group, Golf Tournament, Baltusrol Golf Club, Springfield, N. J.

Aug. 10. No. California Rubber Group, Summer Outing, "Old Hearst Ranch", Pleasonton, Calif.

Aug. 22. Philadelphia Rubber Group, Summer Outing, Cedarbrook Country Club, Philadelphia, Penna.

Sept. 4. No. California Rubber Group, Elks Club, Berkeley, Calif.

Sept. 8-11. A.S.M.E., Fall Meeting, Chicago, Ill.

Sept. 11. So. Ohio Rubber Group, Engineers Club, Dayton, Ohio.

Sept. 13. Connecticut Rubber Group, Outing.

Sept. 14-19. A.C.S., Annual Meeting, Atlantic City, N. J.

Sept. 17. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Sept. 25. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne, Ind.

Oct. 3. Detroit Rubber and Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 7. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Oct. 9. No. California Rubber Group, Elks Club, Berkeley, Calif.

Oct. 17. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Oct. 24. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Oct. 29-31. Rubber Division, A.C.S., Fall Meeting, Hotel Statler, Buffalo, N. Y.

Nov. 6. No. California Rubber Group, Elks Club, Berkeley, Calif.

Nov. 11. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Nov. 14. Connecticut Rubber Group, Fall Meeting.

Nov. 21. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Dec. 4. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne Ind.

Dec. 12. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Dec. 12. Detroit Rubber and Plastics Group, Christmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 12. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 13. So. Ohio Rubber Group, Miami Valley Golf Club, Dayton, Ohio.

Dec. 16. Buffalo Rubber Group, Xmas Party.

Dec. 19. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Mar. 18-20, 1953. Rubber Division, A.C.S., Hotel Statler, Los Angeles, Calif. (In conjunction with 122nd meeting of A.C.S.).

May 27-29, 1953. Rubber Division, A.C.S., Spring Meeting, Hotel Statler, Boston, Mass.

Sept. 9-11, 1953. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

Champion Heavy-Duty Truck Tire

Firestone Tire & Rubber Co. has introduced a newly-developed heavy-duty truck tire to meet the large popular price market. The new tire is of rayon construction with a new, tough, longer-wearing rubber compound in the tread and it has a heavy, strong bead that insures maximum stability through a better fit on the rim, the company said. Company officials stated that the new "Champion Heavy-Duty Truck Tire" offers longer original mileage and longer retread mileage because the super gum-dipped, tension-dried rayon cord eliminates tire body growth and tread cracking. The flatter tread of the new tire, combined with many new and advanced features of design and construction, assures truck owners and operators of greater safety, extra mileage and lower cost-per-mile operation, officials said.

Mansfield "Hi-Lug" Truck Tire

Mansfield Tire & Rubber Co. has introduced a new "Hi-Lug" premium tire designed especially for trucks and off-the-highway use. Priced approximately 10% above conventional premium grades, the Hi-Lug provides one-third more tread volume with up to 50% greater non-skid qualities than regular truck tires, the company claims. Other features include two additional cap plies between the conventional plies, which provide added strength without sacrificing flexibility; specially designed treads which eliminate costly channel cuts, tread cracking and premature wear; and improved traction and recappability because of the deeper tread, the company says. The new tires are presently available in three sizes, but three additional sizes will be added to the line at a later date.

$4,266,000 DAMAGE SUIT FILED BY TIRE DEALERS NEARS SETTLEMENT

A $4,266,000 damage suit which a group of tire dealers filed against six major tire companies nearly four years ago was all but settled at this writing (July 1). One count charging the companies with "conspiracy to raise, fix, maintain, make uniform and non-competitive" prices of tires and tubes was dropped. An amended complaint, filed by the National Association of Independent Tire Dealers in Federal Court in Washington, D. C., eliminated this charge. The association in its new petition confined its allegation to price discrimination, the second count of the original complaint. The manufacturers entered another answer, denying the charge. However, they have reached a settlement of the matter with the dealers.

In its first petition filed in October, 1948, NAITD asked damages from the Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., B. F. Goodrich Co., U. S. Rubber Co., and the Lee Rubber & Tire Corp. The Rubber Manufacturers Association was also named a defendant.

NAITD has notified its dealers that an agreement between counsel of all parties was filed in court completely disposing of the first count—the one charging conspiracy over prices. As for the second count, counsel prepared in final form a proposed judgement for injunctive relief against the practices complained of in the petition, the association added. At the same time, NAITD disclosed there had been a financial settlement but did not indicate the amount. It merely explained that the organization had already "recovered its expenses in this litigation."

The agreement over the price discrimination charge will now be submitted to the attorney general for review. If he has no objections, the settlement will be taken into Federal Court for formal approval. These final steps may require several weeks. Briefly, the settlement terms touch three main points:

(1) *National Accounts*—Each company store or dealer selling to commercial or national accounts, to do its own pricing and billing, acting without dictation from the home office. Under present conditions, all bills of this customer, regardless of where tires were bought, are sent to a centralized point and he is billed the same price throughout the country. Dealers complained that this tended to fix a price for a local market. If it wasn't for this national price, they could often get a better price locally, they complained.

(2) *Tire Mileage*—Manufacturers agree not to grant tire mileage contracts to bus companies with less than 50 vehicles or cab firms with less than 100 vehicles. Present contracts, regardless of the number of vehicles involved, are not to be disturbed. Under such deals, tire firms keep vehicles in fleets equipped with casings for which they collect on a mileage basis.

(3) *Government Accounts* — Present practices are generally unchanged. Manufacturers now pay a commission to a dealer to deliver to a state or local government account. They have agreed to notify the state that any dealer can earn this commission.

ROSSER AND MASON NAMED OFFICERS OF SEIBERLING RUBBER OF CANADA

Lee T. Rosser

W. H. Mason

Seiberling Rubber Co. of Canada, Ltd., has announced that Lee T. Rosser has been elected vice-president and assistant general manager of the company, while W. H. Mason has been named secretary and treasurer. Mr. Rosser was formerly San Francisco district manager of the Seiberling Rubber Co., Akron, Ohio. Mr. Mason previously held the post of manager of factory accounting for Seiberling Rubber in Akron. Mr. Rosser joined the Akron company in 1945 after previous service with the B. F. Goodrich Co. in all its tire divisions. He was in Seiberling Rubber's Merchandising Department before being named district manager in 1946. Mr. Rosser's election fills a place in the Seiberling Canadian organization made vacant by the death of H. W. Gregory, a vice-president and director, on April 1. Mr. Mason, a veteran of 26 years' service with Seiberling Rubber in Akron, worked in all divisions of the Accounting Department, and was named factory accounting manager in 1942. He joined the company after completing his formal education in 1926. Mr. Mason succeeds D. G. Richards, who recently resigned to join another firm.

Borden Opens New Plant

Borden Co. recently opened its new $1,000,000 formaldehyde plant, the first such unit in the Southeastern United States. Located at Demopolis, Ala., the new plant will soon begin to produce synthetic resins and hexamethylenetetramine. Plans call for the annual output of 20,000,000 pounds of formaldehyde, 24,000,000 pounds of synthetic resins, and 1,200,000 pounds of "hexa." The formaldehyde will be used principally by the Demopolis plant and its sister plant at Kernersville, N. C., in the manufacture of synthetic resin products which are used as industrial adhesives and bonding agents. "Hexa" is an intermediate product used by the chemical and plastics industries. The company also plans to offer the material to the rubber industry in the near future. Borden is now also completing its new resorcin plant at Dominguez, Calif., while its formaldehyde plant at Springfield, Ore., is being expanded. The company is also constructing a new central research laboratory at Philadelphia, Penna., adjacent to its plant which manufactures plastic molding powders and compounds.

Another copy of RUBBER AGE needed in your office? Use the coupon on page 561.

Richardson Named to New Post

Robert W. Richardson, formerly assistant to J. M. Linforth, vice-president in charge of manufacturers' sales for the Goodyear Tire & Rubber Co., has been named assistant to president E. S. Burke of the Kelly-Springfield Tire Co. at Cumberland, Md. Mr. Richardson has been with the Goodyear organization since 1934, when he joined the company's training squadron after graduating from Purdue University. In 1935 and 1936 he was employed in Goodyear Service Stores. He returned to Akron in the Mechanical Goods Sales Department in 1936. Subsequently, Mr. Richardson held sales positions with the Mechanical Goods Division in Chicago and Buffalo. In 1941, he was appointed district manager of the company's Aviation Products Division at Dayton, Ohio, remaining there until 1944, when he again returned to Akron as assistant manager of the manufacturers' sales organization of the Mechanical Goods Department. Mr. Richardson served as manager of the Aviation Products Division from 1945 until his appointment as Mr. Linforth's assistant. In that capacity, he was charged with coordinating activities of aviation products and government sales, and assisting Mr. Linforth in handling government and aircraft business.

NAMES IN THE NEWS

R. B. Lowe, associated with the Bakelite Co. since 1923, has been named vice-president in charge of engineering and construction while R. K. Turner, since 1946 affiliated with the Works Management Department of the company in New York City, has been named vice-president in charge of production.

George K. Hinshaw, vice-president in charge of foreign operations for the Goodyear Tire & Rubber Co., was recently presented with a 35-year service pin marking his long service to the company.

William T. Kiessling, formerly associated with the Hercules Powder Co., has joined the Rubber Corporation of America as a technical sales representative for the company's line of plasticizers.

Willfred W. Lufkin, Jr., executive vice-president of the Wellington Sears Co., has been elected a director of the company.

John F. Snedeker, purchasing agent for the Binney & Smith Co., has been elected president of the Purchasing Agents Association of New York. M. D. MacBurney of the Barrett Division, Allied Chemical & Dye Corp., and S. W. Mackenzie of the U. S. Rubber Co., have been elected vice-presidents.

Rudolph A. Schatzel, vice-president and director of engineering and research of the Rome Cable Corp., has been elected a director of the company.

Dr. Roy J. Plunkett, associated with the Organic Chemicals Department of E. I. du Pont de Nemours & Co., Inc., was presented with the John Scott Award in recognition of his discovery of "Teflon" tetrafluoroethylene resin at a special dinner meeting of the South Jersey Section of the American Chemical Society on June 4.

Thomas C. Dabovich, previously regional sales manager for Sharples Chemicals, Inc., has been named sales manager of the Industrial Chemical Division of the J. T. Baker Chemical Co., Phillipsburg, N. J.

Palmer W. Griffith, technical service director—West Coast—of the American Cyanamid Co., received the eleventh annual John Wesley Hyatt Award "for achievement of wide importance to the plastics industry" on June 5 at a special award banquet in New York City.

Gordon A. Ogden, associated with the International Latex Corp. since 1948, and since 1949 serving as assistant to the president, has been elected a vice-president of the company.

Walter J. Lee, formerly assistant general manager of the Rim Division of the Goodyear Tire & Rubber Co., has been promoted to general manager of the division.

Richard H. Starrett, previously a development engineer for the Pfaudler Co., has been appointed chief engineer of the Elyria, Ohio Division of the company.

David E. Williams, formerly assistant sales manager of the Furniture and Toy Division of the Hettrick Manufacturing Co., Toledo, Ohio, has been named assistant sales manager of the Goshen Rubber Co.

Donald C. Oskin, previously director of district sales for the Westvaco Chemical Division of the Food Machinery & Chemical Corp., has been named assistant manager of sales for the division.

John Mason, Jr., formerly associated with the Naval Research Laboratories at Washington, D. C., has joined the staff of the Atlantic Research Corp., Alexandria, Va., to work with the firm's Electromechanical Division.

Paul A. Mallard, formerly with the Mare Island Naval Shipyard, Vallejo, Calif., is now associated with the Aeronautical Materials Laboratory, Naval Air Experimental Station, Philadelphia, Penna., as rubber technologist.

Dr. A. H. Gower, formerly a technical sales representative for the Industrial Chemicals Division of the American Cyanamid Co. at Boston, Mass., has been named assistant district manager of the Philadelphia and Baltimore districts of the division.

E. E. Ellies, formerly manager of the Films and Flooring Department of the Goodyear Tire & Rubber Co., resigned on July 1 to become vice-president and director of sales of the Transparent Packaging Co., Inc., Chicago, Ill.

William A. Bloch, formerly chief accountant of Godfrey L. Cabot, Inc., has been named comptroller of the company, succeeding James S. Kennedy, who retired because of ill health.

George E. Fithen, Jr., formerly associated with the Goodyear Tire & Rubber Co., has been appointed sales promotion and merchandise manager of the Tire Division of the Dayton Rubber Co.

G. W. Bush, associated with the Calco Chemical Division of the American Cyanamid Co. since 1948, has been named sales representative in the Chicago territory for the Pigment Department of the company.

Terry L. Beals, associated with the Goodyear Tire & Rubber Co. since 1948, has left for Bogor, Java, where he will serve as manager of technical service.

Robert A. Riesman has been elected president of the Royal Electric Co., Pawtucket, R. I., succeeding Joseph G. Riesman, who has been elected chairman of the board.

Dr. Robert Yohe, president of the American Anode Division of the B. F. Goodrich Co., has been installed as new president of the Optimist Club in Akron.

Fred A. Sawyer, associated with the U. S. Rubber Co. for the past 13 years, has been named assistant development manager of the Footwear and General Products Division of the U. S. Rubber Co.

E. E. "Dutch" Moore, associated with the National Rubber Machinery Co. since 1928, has been appointed a member of the Sales Department of the Rubber Machinery Division. He was formerly associated with the Tire and Tube Mold Division with duties covering both engineering and sales.

Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., was recently presented with the Republic of Liberia's highest honor, the Grand Band of the Order of the Star of Africa, in recognition of the "salutory and beneficial effect" which the Firestone development in Liberia had upon the life of the country.

Lester F. Cox has been elected executive vice-president and executive manager of the Thermoid Co.

Dr. Harold M. Sonnichsen has been appointed technical director of the Industrial Tape Corp.

R. W. Briner, formerly chief chemist of the Pantasote Co., has been appointed sales representative by the Chemical Sales Division of the Firestone Tire & Rubber Co. for the New England territory.

William D. Peace, previously manager of the Akron plant of the Johnson Steel & Wire Co., has joined the National-Standard Co.

J. J. MacMahon, associated with the Carr Manufacturing Corp., Bristol, R. I., for the past few years, has been named chief chemist of the company, succeeding E. E. Zeilstra who recently left to join the Lloyd Manufacturing Co.

Dale Button, who has been associated with the Firestone Tire & Rubber Co. for the past 15 years, recently joined the Globe Manufacturing Co., Fall River, Mass., as chief chemist.

George R. Weppler, formerly a director and general production manager of the Industrial Tape Corp., has been elected vice-president in charge of manufacturing of the L. E. Waterman Co.

40th Anniversary

of

CARBON BLACK REINFORCEMENT IN TIRES

1912 1952

FIRST in 1912 – FIRST in 1952

Two events of importance to the rubber industry are worthy of note this year. First, forty years ago Binney & Smith Co. supplied the first carbon black to be used in reinforcing rubber for automobile tires. Second, this year Columbian Carbon Co. introduced the first commercially available SAF...

SUPER ABRASION FURNACE
STATEX-125

With the introduction of this new carbon black, tire mileage can be increased 20 to 25% over present performance.

1912 – 1,000,000 pounds a Year • 1952 – 1,000,000 pounds a Day!

• A COLUMBIAN COLLOID •

COLUMBIAN CARBON CO. • BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR

new!

SAF (Super Abrasion Furnace)

STATEX-125

◆

HAF (High Abrasion Furnace)

STATEX-R

◆

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

FF (Fine Furnace)

STATEX-B

◆

FEF (Fast Extruding Furnace)

STATEX-M

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

COLUMBIAN CARBON CO. • **BINNEY & SMITH CO.**

MANUFACTURER DISTRIBUTOR

Named Assistant Sales Manager

Lewis B. Smith

Lewis B. Smith, formerly associated with the Technical Service Department of the Binney & Smith Co., has been transferred to the Sales Department in the capacity of assistant sales manager of the Specialty Blacks Division. Mr. Smith joined Binney & Smith in November, 1949, as a technical representative. A 1941 graduate of Northeastern University with a degree in chemical engineering, Mr. Smith was associated with the Research Department of C. K. Williams & Co. until September, 1942, when he entered the U. S. Navy. On his return to civilian life in 1946, Mr. Smith joined the Calco Chemical Division of the American Cyanamid Co., where he later became assistant production superintendent of the titanium dioxide plant in Gloucester, N. J. Mr. Smith is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Brazil Gets Complete Resin Plant

A complete chemical plant which will manufacture synthetic resin copolymer emulsions has been shipped to Sao Paulo, Brazil, the American Polymer Corp. of Peabody, Mass., announced recently. William Epstein, general manager of the Chemicals Export Co., operators of American Polymer's foreign department, said that expanding sales in Brazil necessitated the move. A new corporation, Polymer Productos Quimicos do Brasil S. A., has been formed to run the new plant. Contractual agreements were made with business interests in Brazil for the formation of the new firm. The new plant will polymerize a wide range of monomers, producing chemical specialties used in the plastic, paint, adhesive, textile, leather and agricultural fields.

Sharples Moves Sales Offices

Sharples Chemicals Inc., has announced the removal of its Akron sales office from 34 Cherry St. to 106 South Main St., Akron 8, Ohio. The company has also moved its Eastern Regional Sales Office from 350 Fifth Avenue to 500 Fifth Avenue, New York 18, N. Y.

Freeze-Resistant Bands

Freeze-resistant white rubber bands, made by the B. F. Goodrich Co., are now available for use in packaging and storing food in refrigerators, home lockers and deep freeze units. Made of a special rubber compound developed to resist sub-zero temperatures, these bands can be used in temperatures as low as 30 to 40 degrees below zero and still retain their elasticity, the company said. The rubber bands are made in an assortment of popular sizes suitable for a variety of types and sizes of packages.

Johnson Steel President Retires

George E. Peace, president of the Johnson Steel & Wire Co., Worcester, Mass., has retired from the company. Three brothers, Charles D., Bernard A. and George C. Johnson, along with Mr. Peace, established the concern 26 years ago. In 1937, Mr. Peace, went to Akron to take charge of the company's plant in that city which produces bead wire for tire manufacturers. A similar plant is located in Los Angeles, while the main products of the Worcester facility are wire for piano and automobile companies. In 1947, Johnson Steel was sold to the Pittsburgh Steel Co. who now operate the company as a subsidiary. In 1949 the Johnson brothers retired and Mr. Peace, then a vice-president of Johnson Steel, was named president. With his retirement, Pittsburgh Steel directors have named Avery C. Hand, president of the parent company, as president of Johnson Steel. E. Milton Barber, executive vice-president of Pittsburgh Steel, has been named to the same post at Johnston Steel. Early in June, William D. Peace, son of the retired president, resigned from his post as manager of the Johnson Steel Akron plant to join the National Standard Co. On July 1, George W. Forsberg, purchasing agent, and Gerald R. McClure, treasurer of Johnson Steel, also retired from the company.

Rubber Air Freight Rates Drop

Rate reductions of 23 per cent on air freight shipments of rubber products between the Pacific Northwest and 14 inland and Atlantic Seaboard cities have been placed in effect by United Air Lines. The new low rate applies to 1,000 pounds or more of rubber products flown by United to Seattle, Tacoma and Portland from Denver, Chicago, Milwaukee, South Bend, Toledo, Akron, Cleveland, Detroit, Philadelphia, Newark, New York, Hartford, Providence and Boston. On rubber products flown from Seattle, Tacoma and Portland to the forenamed cities, the reduced rate applies to shipments of 100 pounds or more.

Need another copy of RUBBER AGE? Use the coupon on page 561.

Harrison Joins Atlantic Tubing

Dr. John G. Harrison

Dr. John G. Harrison has been named director of research and development at the Atlantic Tubing and Rubber Co., Cranston, R. I. Dr. Harrison will head research in all divisions and departments of the company. Formerly associated with the Firestone Tire & Rubber Co. in the development of tires, tubes and mechanicals, Dr. Harrison has also been associated with the Vulcan Proofing Co. in the coated fabrics field. He comes to Atlantic Tubing directly from the Trenton Division of National Automotive Fibres, Inc. Dr. Harrison received his Ph. D. in chemistry from the Polytechnic Institute of Brooklyn. Previous graduate work was accomplished in the laboratories of the University of Akron and at Mercer University in Macon, Ga.

Debye Named Professor Emeritus

The retirement of Dr. Peter Debye, professor of chemistry at Cornell University and Nobel Prize winner, was recently announced. Effective on his retirement July 1, the Cornell board of trustees conferred emeritus rank on Dr. Debye, who will remain at Cornell to do research work. Dr. Debye won the Nobel Prize in chemistry in 1936 for his work on the dielectric properties of liquids and on X-ray and electron diffraction of molecules. His other honors include the Franklin, Lorentz, Rumford and Willard Gibbs medals. His recent studies have been concerned with the structure and properties of large molecules, such as occur in synthetic rubber and rayon. A native of Maastricht, the Netherlands, Dr. Debye became an American citizen in 1946.

New Quaker Rubber Facilities

Quaker Rubber Corp., a division of the H. K. Porter Co., has put its new $750,000 compounding and mixing building at Philadelphia, Penna., into operation. The new facilities are designed to provide over-all increased production. The additional building is said to provide Quaker Rubber with the most modern and efficient quality control in processing industrial rubber products.

RUBBER GROUPS ABOUT THE COUNTRY HOLD INTERESTING SUMMER OUTINGS

With the coming of the summer months many of the rubber groups about the country forego their usual technical meetings to hold picnics, golf tournaments and outings. These annual affairs usually feature different athletic contests, while those less athletically inclined play cards, snooze under a shady tree, or just sit and talk with the boys. Reports on the activities of some of these groups at their annual outings follow:

AKRON RUBBER GROUP

Some 710 members and guests of the Akron Rubber Group attended the Annual Summer Outing held on June 20 at the Firestone Country Club, Akron, Ohio. The main attraction of the day's activities was a golf tournament in which 245 participated. John Cseh (Firestone) retained his championship with a par-breaking 69. Other members who turned in low scores were: C. E. Greene (General Tire) and Paul Tobin (Firestone), 73; Robert Ferguson (General Tire), 74; Harry Falor, 75; Kermit Weinstock (General Tire), 77; C. J. Ball (Xylos Rubber), F. B. Shaw (Wooster Rubber) and Robert Sucher (Marbon), 79; and John Rowe (Xylos Rubber), 80. Milton Leonard (Binney & Smith) won the "hand mashie" event with a throw of 110 yards. George Lenhart (Wilson Rubber) won the long drive and Warren Grote (General Tire) placed first in the accuracy contest.

Other activities on the program were an afternoon of softball and horseshoe pitching, followed by dinner and the distribution of prizes. Over 400 door prizes were distributed.

William V. Sauter (DuPont) was general chairman of the outing. Harry McCollum (DuPont) was chairman of the Golf Committee. Charles Stalker (General Tire) served as chairman of the Prize Committee, while L. V. Cooper (Firestone) was in charge of arrangements for food and location.

BOSTON RUBBER GROUP

The Andover Country Club, Andover, Mass., was the scene of the annual outing of the Boston Rubber Group on June 20th. Approximately 500 members and their guests attended the outing, while 164 participated in the golf tournament. Edwin D. Covell (Stedfast Rubber) acted as general chairman for the outing. A softball game between teams representing Godfrey L. Cabot, Inc. and the American Resinous Chemicals Corp. was won by the Cabot team by a score of 10 to 3. Other events and winners follow:

Putting, H. D. Bainbridge, Jack Bernstein, Roy Brown, C. L. Hamilton, and H. A. Gray; *Horseshoes*, W. Mason, W. Butler, Mr. Welber, and P. L. Blanchard; *Darts*, E. Bradley and G. Kenniston; *Tub and Ball*, M. H. Breiseher, H. Johnson, R. W. Briner, and R. Guecco.

Prize winners of the golf tournament included the following: *Kickers' Handicap*, H. A. Garfield, H. N. Hussey, E. Varnum, E. H. Kroepel, F. M. Barrett, A. L. Midyette, George Laaff, H. I. Armstrong, P. G. Cook, C. T. Mitchell, and G. Bushway; *Low Gross*, H. W. Bainbridge, J. Beale, and J. A. Loring; *Low Net*, A. B. McDonald, R. Painter, P. A. Uva, D. G. Preston, and J. M. Washburn; *Nearest to Pin*, Thomas Kane; *Longest Drive*, A. W. Henderson, W. R. Smith, and W. E. Kavenagh; *High Net*, Jack Andrews; *High Gross*, T. W. Kendall.

DETROIT RUBBER AND PLASTICS GROUP

Approximately 400 members attended the Detroit Rubber and Plastics Group Annual Summer Outing held on June 27 at the Forest Lake Country Club, Pontiac, Mich. A majority of the members played golf with a valuable assist from the weatherman. Walt Bauer (Brown Rubber) acted as general chairman for the outing, while John Craft (General Tire) and H. W. Neale (Pioneer Latex) distributed the gifts.

NEW YORK RUBBER GROUP

The Annual Outing of the New York Rubber Group was held on Thursday, June 12, at Doerr's Grove in Millburn, N. J., with approximately 165 members and guests attending. The day was devoted to sports and contests, followed by an excellent chicken dinner. Food and drink were also served throughout the day.

Winners in the various events included the following; *Boccie*, Tom Loser (Georgia Marble) and Mel Lerner (RUBBER AGE); *Baseball Throw*, A. Goldsmith (Muehlstein); *Darts*, M. Master (Niagara Rubber), first, and R. J. Love (Pequanoc Rubber), second; *Horseshoes*, Bill Lamela (Okonite), first, and Mac Doane (H. V. Hardman), second; *Basketball Throw*, Bill *Silverstein* (Geo. Woloch), first, and M. R. Buffington (Lea Fabrics), second; *Golf Throw*, H. R. Shafer (Binney & Smith), first, and O. J. Zeiller (Titanium Pigment), second; *Egg Throw*, Dick Ebersbach and George Campbell (American Hard Rubber). The tug-of-war was won by the team headed by Russ Kurtz (DuPont). There were also several baseball contests.

The outing was in charge of George Vacca (Bell Telephone Labs.) as chairman, assisted by the following: Bob Carroll (Boccie), Bob Seaman (Darts), Bill Lamela (Horseshoes), Tom Loser (Golf Throw), Henry Peters (Softball), Mac Doane (Egg Throw), Tom Callahan (Basketball Throw), George McNamara (Baseball Throw), and Bill Rea (Tug-of-War).

QUEBEC RUBBER AND PLASTICS GROUP

Approximately 100 members and guests of the Quebec Rubber and Plastics Group attended the annual golf tournament held on June 6 at the Granby Golf Club, Granby, Que., Canada. The meeting also featured an election of officers for the 1952-53 season of the group. Members elected to office include: *Chairman*, W. R. Blondell (Dominion Rubber); *Secretary-Treasurer*, W. Edward (Delacour-Gorrie).

M. Renshaw (British Rubber) has been named to handle publicity for the 1952-53 season. Executive Committee members for the coming season include: C. W. MacEachern (General Latex), A. S. Johnston (Northern Electric), A. Beauchamps (Dominion Rubber), R. Harrison (Canadian General Electric), G. Fournier (Acton Rubber), E. Halsall (Dominion Rubber), R. Woolerton (Dominion Oilcloth), F. King (Canadian Resins), E. May (Dominion Rubber), A. MacAuley (Northern Electric).

The Golf Committee for the outing consisted of R. Harrison and A. Beauchamps. Low gross for the day went to C. P. Dearth (Bolta Plastics). Approximately 40 prizes were distributed at the outing.

SOUTHERN OHIO RUBBER GROUP

The Southern Ohio Rubber Group held its annual outing on June 7 at the Inland Activities Center, Dayton, Ohio. William L. Nolan (Inland Mfg.) acted as general chairman for the outing. The following members served on the different committees for the outing: *Golf Committee*, Howard Butler and Bill Clingman (Inland Mfg.); *Food Committee*, William L. Nolan, J. E. Feldman, Paul Ganger, W. R. McGlothlin (Inland Mfg.), and Leo J. Fitzharris (Frigidaire); *Beer Committee*, James Saettel, Frank Ekberg, Tom Hufziger, John Russell, and Harold Weese (Inland Mfg.).

Contest Committee, Harold Bell (Firestone)—Shuffleboard, Bud Dill (Dayton Rubber)—Basketball, Free Throw, John Poffenberger (Cincinnati Rubber)—Horseshoes, and Chuck Wimmer (Phillips Chemical)—Foot Golf. In the baseball game, Roy Marston (Binney & Smith) and Bob Sucher (Marbon) managed the "Suppliers", while George Lapois (Inland Mfg.) and James C. Haren (Precision Rubber) managed the "Industry" team. Card games were arranged by John Walsh (Xylos Rubber) and Dayle Buchanan (Inland Mfg.).

Leo Fitzharris and Russ Hoskin (Inland Mfg.) were in charge of registration, while contest awards were arranged by Harold Bell, Bud Dill, John Poffenberger, and Chuck Wimmer. Golf awards were handled by Bill Clingman and Howard Butler. A committee consisting of Jack Feldman, Leo Fitzharris, Bill Nolan and Russ Hoskin handled door prizes.

The baseball game was won by the "Industry" team with a score of 1 to 0. Other contest winners included: *Free Throws*, Bill Clingman, Bob Overman (Inland Mfg.), and Bob Krause (Inland Mfg.); *Horseshoes*, Bob Overman, Bill Clingman, Frank Newton (Dayton Rubber), Bill Ferguson (Ball Bros.), John Walsh, and John Poffenberger; *Kick Golf*, Milt Leonard (Binney & Smith), Virg Somsel (Inland Mfg.), and Bill Ferguson; *Shuffleboard*, Jim Wall, Russ Hoskin, Harold Bell, John Russell, Bob Radow, and Frank Newton; *Golf*, Bert Stangor (DuPont), Lou Keyes (Dayton Rubber), Jerry Kelble (Dayton Rubber), Bob

Radow, Howard Butler, Milt Leonard, Bill Ferguson, Bill Clingman, Bob Overman, Frank Newton, Bob Kraus, John Walsh, and John Poffenberger.

WASHINGTON RUBBER GROUP

Approximately 100 members and guests of the Washington Rubber Group attended the Annual Summer Outing held on June 27 at the Annapolis Roads Club in Annapolis, Md. A chicken and fish dinner was served and a total of approximately 80 prizes, including 50-odd door prizes were distributed. R. J. Devereaux (Goodrich) served as chairman of the Golf Committee which included T. R. Scanlan (Gates Rubber). The chairman of the Sports Committee was I. T. Miller (Gates Rubber) while Don Kothe (Potomac Rubber) and Ethel Levene (Bureau of Ships) also served on the committee. W. J. Sears (RMA) served as chairman of the Prize Committee which also included R. E. Harman (Connecticut Hard Rubber).

Dr. Russell Kurtz (DuPont) won the Washington Rubber Group Trophy with Larry Koppel (Firestone) as runner up. The Industrial Trophy was won by Harold D. Brown (Gates Rubber) with Roy Devereaux coming in second. The Women's Washington Rubber Group Trophy was won by Miss Marge Rice. First prize in the bridge tournament went to Charles C. Miller (RMA). Walter Krappe of the Rubber Section, NPA, won in water sports while T. R. Scanlan won the distinction of being the "laziest golfer."

L. S. McCoy (Quaker Rubber) won the horseshoes tournament, while the women's ping pong event was won by Miss Ethel Levene. Lt. Commander V. Sabary of the Office of Naval Materials won the men's ping pong event. Miss Oneta Smith won a bathing contest while a fishing prize was taken by Roy Blandford.

Rusco Fused Brake Lining

Russell Manufacturing Co., Middletown, Conn., has developed a new method of manufacturing brake lining for which it has been issued U. S. Patent 2,584,825. In the process, strands of asbestos web are saturated and completely surrounded with a special frictional binder material. This mass is compressed under 300 tons of pressure, effecting a density of 120 pounds per cubic foot, with a tensile strength nearly ten times that of conventional woven brake lining. The result is said to be a quality brake lining with uniform structure throughout, with uniform coefficient of friction, with uniform rate of wear and a distinctive appearance during the whole life of the lining. Because of its greater density and tensile strength, it is claimed that "Rusco Fused Fabric" brake lining will not absorb water. Frictional heat evaporates surface moisture, allowing almost immediate braking recovery. Grabbing and fade are reduced to a minimum. The patent was granted to Gustav Walters, vice-president and director of research, and H. Clifford Morton, assistant director, and assigned to Russell Manufacturing.

Technical Service Bulletin G-3 describing the characteristics and uses of lithium hydroxystearate has been published by the Witco Chemical Co., New York, N. Y.

Black Output Rising

The Defense Production Administration has received 31 applications for rapid tax amortization on new carbon black facilities, and as of June 19 had granted 22 Certificates of Necessity. The certificates already granted will result in 717,000,000 pounds additional capacity by January 1, 1955. This is 83,000,000 pounds short of the agency's goal of 800,000,000 pounds. DPA said of the remaining applications, only four are still pending. The rest were either denied or withheld for various reasons.

Develops Concrete Transfer Hose

U. S. Rubber Co. has developed a new rubber hose for the construction industry which can be used to transfer concrete from a batch mixer to trucks at a considerable saving in time and cost. Although the first cost of the hose is higher than the canvas spout usually used by ready-mix concrete companies for this purpose, it is more economical in the long run because it lasts at least six months whereas canvas is usually good for an average of one week. Users say the hose remains flexible throughout its life while canvas absorbs the concrete and becomes stiff. The hose is also easier to clean and is free of clogging. A major cost-saving factor is that trucks and other expensive equipment will no longer have to be kept idle at frequent intervals to change the canvas spout. The new hose is made in various sizes ranging from 18 to 24 inches in diameter and from 18 to 36 inches in length. It is made of natural rubber reinforced with two plies of special fabric. In use, one end is attached to the end of the batch mixer and the other end hangs free over the hopper of the truck to be loaded.

Goodyear Forms New Division

Establishment of a Films, Foam and Flooring Division coordinating development, production and sales of these products, has been announced by the Goodyear Tire & Rubber Co. Joseph E. Mayl, vice-president of the company, has been named general manager of the new division. Departments involved in the reorganization are Foam Rubber Sales under R. E. Pauley; Vinyl Film Sales under J. S. Bruskin; Pliofilm Sales under E. H. Dours; Rubber and Vinyl Flooring sales under H. M. Evans; Foam Rubber and Pliofilm Production, C. H. Maxwell; Foam Rubber Development, G. H. Barnes; Vinyl Production, G. H. Reynolds; and Vinyl, Pliofilm and Flooring Development under M. J. DeFrance. Mr. Mayl, connected with the rubber industry since 1911, joined Goodyear in 1924 in truck tire sales. He was made manager of bus and truck tire sales in 1928, manager of the Southern Division in the following year, and manager of all tire sales in 1930. He was named a vice-president of the company's California subsidiary in 1937, and in 1944 returned to Akron as vice-president and sales manager of Goodyear's Tire Division. He became vice-president and sales coordinator for all of Goodyear's products in 1949.

Solka-Floc D Dusting Agent

Brown Co., Berlin, N. H., has introduced "Solka-Floc D," a new dusting agent noted for its low gravity. Ultrafine for easy application, the product is non-toxic and non-abrasive. Absorbed into the surface during molding, Solka-Floc D will not interfere with cohesion in the mold. The company states that the product will not build up in the mold and improves cementability in soling, sponge, etc. In addition, it will not soften or streak.

Pioneer Rubber Co. has introduced a colorful new toy balloon patterned after the image of Jimmy Durante which inflates to 15-inch size.

NEW HALE AND KULLGREN HEADQUARTERS PROVIDE INCREASED FACILITIES

Shown above is a view of the new Hale and Kullgren headquarters at 613 East Tallmadge Avenue in Akron, Ohio. The new building is capable of housing the engineering staff and drafting room on the first floor, with the administration and sales offices on the second floor.

BUNA PRODUCERS IN GERMANY GET PRICE EQUALIZATION AID

According to a new decree issued by the German government at Bonn, producers of Buna in Germany will now have the benefit of a price equalization fund. The plan was arrived at after consultation with the German rubber manufacturing industry. Under the plan, for every kilogram (2.2 U. S. pounds) of natural rubber or GR-S or Polysar S used, the manufacturer must pay 20 pfennigs (not quite 5c) into the fund.

Production of Buna started at the Huels Chemical Works near Recklinghausen last November. It is believed that the monies in the new fund will help defray the cost of producing the Buna and permit its sale at competitive prices. This will keep Huels from having to shut down its synthetic production entirely. Industry representatives will administer the fund.

Spokesmen for the rubber manufacturers point out that there are several reasons why Germany should keep its synthetic production going. Firstly, they say, Buna has qualities not possessed by natural rubber, and for many purposes a mixture of the two is better than either alone. Secondly, some Buna is going to be necessary no matter how low the natural rubber price falls, since Germany cannot afford the foreign exchange to import her needs. Thirdly, they feel that synthetic rubber research should go on in the native country of the product.

In this connection, Otto Friedrich, president of Phoenix Rubber in Hamburg, revealed that the Firestone Tire & Rubber Co. had begun right after the war to push for the revival of German Buna production on the ground that German research ought to contribute its share toward the future development of synthetic rubber.

Huels has been reported in difficulties with Buna production since the natural rubber price began to drop last fall. It had originally been announced that the Huels plant could make Buna for about DM 4.70 a kilogram at a rate of 500 metric tons a month.

Cabot Cabflex DDA and DDP

Godfrey L. Cabot, Inc., Boston, Mass., has introduced two new all-decyl plasticizers called "Cabflex DDA" (di-decyl adipate) and "Cabflex DDP" (di-decyl phthalate). These two decyl diesters are said to offer far lower volatility and permanence in vinyl compounds than is obtainable from presently available octyl phthalates, yet they retain similar low temperature properties. The introduction of these two new plasticizers opens a general over-all expansion program being put into effect by the company's Plasticizer Division. The program includes development of the production, sales and research activities of the division. Initiation of the program has already resulted in the production of another new plasticizer, "Cabflex Di-Capryl Phthalate." A special Plasticizers Research Laboratory, modernly equipped and staffed by competent technicians is available for the solution of all types of customer problems.

Price Named General Manager

Robert S. Price

Robert S. Price, sales manager of the Plastics Division of the B. F. Goodrich Co. since 1951, has been named general manager of the division, succeeding Clyde O. DeLong, who has been named general manager of the company's Industrial and General Products Division. A graduate of Bucknell University in chemistry and chemical engineering, Mr. Price has been with Goodrich for 14 years. He was first employed in the company's chemical laboratories and was manager of technical service and plastic development before his appointment as sales manager of the Plastic Division.

Whitby and Schade Retire

The University of Akron has announced the retirement of two of its foremost research men. Dr. G. Stafford Whitby, director of the Rubber Research Laboratory, will become professor emeritus of rubber chemistry on September 1, while Dr. James W. Schade retired on June 30. The trustees of the university specified that Dr. Whitby continue teaching rubber technology on a part-time basis and direct campus research projects contracted through the Reconstruction Finance Corporation. The university's official retirement age is 65 but board rules allow extension of service to 70. Dr. Whitby is 65 years old while Dr. Schade, former general manager of the university-operated Government Laboratories on synthetic rubber, is 70. Dr. Schade has managed the Government Laboratories since they first opened in 1944. He retired from the B. F. Goodrich Co. in 1942 after 33 years' service. He has been succeeded as general manager of the laboratories by William K. Taft, his former assistant. Dr. Whitby joined Akron University in 1942. He was associate editor of the *Journal of the American Chemical Society* and for several years a fellow of the Royal Society of Canada.

James W. Jenkins & Co. has moved to new offices at 10 North Main St., Akron 8, Ohio. The telephone number is FOrtage 3831.

1951 PLASTICIZER PRODUCTION ESTABLISHES NEW RECORD HIGH

Production of all plasticizers in 1951 amounted to 280,000,000 pounds, the largest on record, according to preliminary statistics released by the United States Tariff Commission. This was an increase of 15 per cent over production in 1950, the previous record. Sales in 1951 amounted to 210,000,000 pounds, valued at $84,000,000, compared with 187,000,000 pounds, valued at $65,000,000 in the previous year.

Production of cyclic plasticizers in 1951 was 204,000,000 pounds, compared with 181,000,000 pounds in 1950. Sales in 1951 were 152,000,000 pounds, valued at $57,000,000, compared with 137,000,000 pounds, valued at $46,000,000, in 1950—an increase of 11 per cent in quantity and 24 per cent in value. The plasticizer produced in the largest amount in 1951 was di-2 ethylhexyl phthalate, production of which amounted to 65,000,000 pounds.

Production of acyclic plasticizers in 1951 amounted to 77,000,000 pounds, an increase of 22 per cent over that reported for 1950. Sales in 1951 were 58,000,000 pounds, valued at $27,000,000, compared with 50,000,000 pounds, valued at $19,000,000, in 1950.

West Virginia Dropping Material

The manufacture of precipitated calcium carbonate by the Industrial Chemical Sales Division of the West Virginia Pulp and Paper Co. will be discontinued on October 31, according to the company. The company has been manufacturing the product since 1912, devoting the bulk of its production to grades conforming to purity and uniformity standards of the Pure Food and Drug Law and the U. S. Pharmacopoeia. The decision to discontinue the product was prompted by a pronounced shift in demand toward technical grades which have become increasingly difficult to produce at competitive price levels, because of constantly rising manufacturing costs, the company said. Customers have been notified that the company will continue production until October 31 in order to fill existing orders and to give users an opportunity to establish another source of supply. Company officials said that increased efforts would be directed toward the further development of lignin, another product of the division. The company's plant at Charleston, S. C., has raw material for lignin available in quantities sufficient to support production of around 400 tons per day.

Folder on Banbury Rebuilding

Hale and Kullgren, Inc., First Federal Savings and Loan Building, Akron 8, Ohio, has issued a four-page folder on the rebuilding of Banbury Mixers, in addition to new mixing chambers and parts. Photographs show progressive steps in rebuilding a Banbury Mixer and various parts after they have been rebuilt. There is also a brief explanation of the Hale and Kullgren organization, sales representatives for rubber and plastic machinery of the Aetna-Standard Engineering Co.

You can improve

FLEXING

HARDNESS

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A solid, friable resin, effective in highly-loaded GR-S and natural rubber stocks, suitable for white stocks.

POLYMEL C-130

Laboratory-tested and factory-proved, this new resin shows remarkable properties where it counts most—in the factory and in competitive compounds.

For example, in one SM sole stock 30% of the high styrene resin was replaced with Polymel C-130, thus materially reducing the cost of the stock. This factory stock processed exceptionally well, showed good dispersion of the ingredients, had higher hardness and tensile than the original compound *and showed a 3-to-1 increase in flex life!*

These are typical of factory runs with POLYMEL C-130. In addition, its low melting point of 210°F makes it an excellent plasticizing-processing resin for short cycle batches.

POLYMEL C-130 is low priced and readily available. If you haven't done so yet, send for your sample today, or, better yet, ask for a sample and order enough for a trial run in your plant. You'll be gratified with the results.

OTHER POLYMEL PRODUCTS:

D-Tac	Detackifyer
Gilsowax	Extender—Wire Compounds
Sublac Resins	Hardeners—Stiffeners
Polymel 6	Tires—Camelback Solid
Polymel 7	Tires—Camelback Carcass-Liquid
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Joins Lloyd Manufacturing Co.

Edward E. Zeilstra

Edward E. Zeilstra, who has been chief chemist of the Carr Manufacturing Corp. since 1947, has resigned from that organization and has joined the Lloyd Manufacturing Co., Inc., Warwick, R. I., as technical director. He will be in charge of material requirements, quality control, research, and new product development. Mr. Zeilstra received a degree in chemical engineering from Calvin College in 1934 and studied synthetic rubber technology at Princeton University in 1944. From 1934 through 1942 he was associated with the Ford Motor Co. as a rubber chemist and from 1943 to 1945 he was associated with the John A. Roeblings' Sons Co. as chief chemist of the Insulated Wire Division. Before joining the Carr Manufacturing Corp. in 1947 he served as a technical sales representative for the Wilmington Chemical Corp. Mr. Zeilstra is a member of the American Chemical Society as well as the Rhode Island and New York Rubber Groups. He is also a member of the Rhode Island Philatelic Society, the Dearborn Lodge No. 172 F. & A. M., and the National Honor Society.

Denies $200,000 Award to Union

General Cable Corp. has announced that a demand for a $200,000 award against the company made by the United Electrical, Radio and Machine Workers of America, independent, based on an alleged lockout by the company has been turned down in an arbitration decision by James J. Healy, professor of law at Harvard University. The ruling, recently announced by the company, said it gave for the first time "a firm definition of a lockout". The case arose out of shutdowns last year at three of the company's plants in Emeryville, Calif., Los Angeles and Rome, N. Y. In his decision Professor Healy said that a lockout must be an "action on the offense" by an employer for the purpose of "deprivation of employment as an economic weapon to gain concessions from the employees." He held that neither of these elements existed in the situation under review.

FINANCIAL NEWS

Firestone Tire & Rubber Co.

Six Months to April 30: Net income of $19,018,905, after providing a reserve of $0,550,000 for earnings of certain foreign subsidiaries that cannot now be remitted, which is equal to $4.81 a share, compared with $23,082,048, after providing a reserve of $6,450,000, equal to $5.84 a share, in the six months ended April 30, 1951. Sales of the company and its subsidiaries in the six months ended April 30, 1952 amounted to $465,187,866, 3.7% more than the $448,307,918 in the corresponding period of the previous year.

A. G. Spalding & Bros., Inc.

Six Months to April 30: Estimated consolidated net loss of $125,000 after applying a $175,000 tax carry-back credit, contrasted with consolidated earnings of $600,000, after providing $470,000 tax charges, in the first half of the preceding fiscal year. The report explained that the loss was caused by a sudden and severe 35% decrease in sales and higher manufacturing costs.

Dayton Rubber Co.

Six Months to April 30: Net profit of $759,021, which is equal to $1.31 each on 543,041 shares, compared with $1,240,177, or $2.63 each on 453,641 shares in the first half of the preceding fiscal year. Net sales in the six months ending April 30, 1952, totaled $24,624,256, against $25,944,876 in the six months ending April 30, 1951.

Colt's Manufacturing Co.

Twenty Weeks to May 18: Net income of $267,542, which is equal to $3.34 a share on sales of $5,967,632, compared with $257,900, or $3.63 a share, on sales of $4,166,321 in the twenty weeks ended May 20, 1951.

Acushnet Process Co.

For 1951: Net income of $447,770, which is equal to $2.24 a common share on net sales of $9,507,333, compared with $893,-095, or $4.87 a share, on sales of $9,414,882 in 1950.

New Jersey Zinc Co.

First Quarter: Net profit of $2,771,184, which is equal to $1.41 a share, contrasted with $2,515,472, or $1.28 a share, in the first quarter of the preceding year.

"Effect of Prolonged Fluid Aging on Hycar Compounds" is the title of Issue No. 7 of the Hycar Technical Newsletter, released by the B. F. Goodrich Chemical Co., Cleveland 15, Ohio.

Need another copy of RUBBER AGE? Use the coupon on page 561.

Honored by Worcester Tech

Dr. Ernst A. Hauser

Dr. Ernst A. Hauser, Professor of Colloid Chemistry at the Massachusetts Institute of Technology and Visiting Professor of Colloid Chemistry at the Worcester Polytechnic Institute, was awarded the honorary degree of doctor of science at the 84th commencement exercises of the Worcester Polytechnic Institute on June 14. Austrian-born, Dr. Hauser is generally credited with developing the first process for concentrating natural rubber latex. He has been associated with M.I.T. since 1928 and is recognized as one of the world's leading authorities in the field of colloid chemistry.

Rubber Division Paper Deadlines

The Papers Committee of the Division of Rubber Chemistry, American Chemical Society, has announced a September 16th deadline for abstracts of papers to be presented at the Fall Meeting of the Division in Buffalo, N. Y., on October 29 to 31. Abstracts of papers must be in the Secretary's hands by the aforementioned date, and should run about 200 words. The abstracts should be submitted in triplicate. In addition, a statement is required indicating in what laboratory the work was done and the time that will be needed for presentation. The author or one of the co-authors must be a member of A.C.S. At the time of the meeting, three copies of the finished paper must be available for the Secretary, C. R. Haynes, Binney & Smith Co., 41 East 42nd St., New York 17, N. Y. The Papers Committee has also announced that January 2 is the deadline for abstracts of papers to be presented at the March 18 to 20 meeting of the Division in Los Angeles. Abstracts of papers to be presented at the May 27 to 29 meeting in Boston must be in the Secretary's hands by April 16, 1953.

A new technical service report, E-2, giving the properties and uses of methylcyclohexyl stearate, is available from the Witco Chemical Co., New York, N. Y.

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Stevens Named Goodrich Treasurer

Elmer A. Stevens

Elmer A. Stevens, director of purchases for the B. F. Goodrich Co. since 1947, will become treasurer of the company on September 1 when L. L. Smith, treasurer since 1940, reaches retirement age. Mr. Stevens joined Goodrich in 1928 shortly after his graduation from the Sheffield School of Yale University. He was first assigned to the Rubber Processing Division, served in the general chemical laboratories, and in 1929 became a member of the Raw Materials Department. In 1930, he entered the Purchasing Division as a natural rubber buyer and in 1933 joined the company's staff in the Far East, returning to the United States in 1936. In 1940, Mr. Stevens became managing director of the B. F. Goodrich Co., Ltd., Singapore, S. S., and remained there until the last American rubber-carrying boat left Singapore in January, 1942, a few days before the Japanese invasion.

Akron Rubber Machinery Moves

Akron Rubber Machinery Co., formerly located in Cuyahoga Falls, Ohio, has moved to 200 South Forge Street, P. O. Box 88, Akron 9, Ohio. The new facilities provide 50,000 square feet with a railroad siding and a 20 ton overhead crane. The firm specializes in nothing but rubber working equipment. J. R. Maus, formerly associated with L. Albert & Son, has joined Akron Rubber Machinery in a sales and engineering capacity. Company officials point out that they have one of the largest inventories of rubber processing equipment in the country available for inspection. J. M. Hausman is president of the company.

Fire at Witco Chicago Plant

A fire, punctuated with small explosions, destroyed a warehouse and three storage tanks at the plant of the Witco Chemical Co. near Chicago, Ill., on June 11. The fire, of unknown origin, was extinguished in three hours, and firemen were able to save four other storage tanks in the area and the main part of the plant. The tanks contained asphalt solvent while the warehouse contained both asphalt and at least 100 different types of chemicals. Estimates of the damage varied.

Integrate Research Activities

The Research Department of Sharples Chemicals Inc. will be integrated with the Research and Development Division of the parent company, the Pennsylvania Salt Manufacturing Co., in the period from June 15 to September 15. Meanwhile, laboratory facilities at Whitemarsh Hall are being considerably extended by the conversion of additional rooms to laboratories and rearrangement of existing facilities to provide not only for the addition of Sharples research personnel but also to increase Pennsalt's facilities.

Dr. John F. Gall, currently supervisor of research, will become director of the Inorganic Research Department, and will be responsible for Pennsalt's research work in surface chemistry, inorganic synthesis, electro-chemistry and high temperature chemistry. Dr. John F. Olin, director of research for Sharples, will be director of the Organic Research Department in the new organization, with Dr. George McCoy, at present Pennsalt's Organic Group leader, as technical assistant director, and T. E. Deger, Sharples assistant research director, as administrative assistant director.

William M. Lee and Ford R. Lowdermilk, at present supervisors of the Product Development and Process Engineering Departments, will become directors of these departments. The Analytical Section will be given department status, with Dr. Paul A. Munter as supervisor. Dr. Charles E. Inman and F. E. Lawlor will be advanced to group leaders in the Organic Research Department, and the present group leaders in the Sharples Research Departments will continue as group leaders in the Organic Research Department.

For the time being, the work being done on rubber by Dr. B. S. Garvey, Jr., at the Sales Service Laboratory at Devon, Penna., will continue unchanged.

Plan German Plastics Exhibition

The first German post-war plastics exhibition to be held in Dusseldorf on October 11 to 19 will feature a number of interesting developments in the fields of plastics and rubbers. Among these developments will be an exhibit of plastic flooring in which polyvinyl acetate is used in the form of an aqueous dispersion. When this dries it is said to form a covering which is at least equivalent to linoleum and which is superior to it with respect to wear and hardness. The first silicones developed in Germany will also be shown as well as an interesting cross-section of the new group of isocyanate plastics (polyurethanes) developed during the past few years. The new and highly-elastic, oil-resistant plastic "Vulkollan" will also be shown. The new plastics produced in accordance with the "Reppe" formulas will also be shown. Other developments to be exhibited include expanded plastics, wide-band cables, and polyamide foils used in the processing of artificial leather.

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McCarthy Joins Hardesty & Co.

Maurice J. McCarthy

Hardesty & Co., New York, N. Y., manufacturers of stearic acid, red oil, glycerine and various fatty acids, have announced the appointment of Maurice J. McCarthy as director of sales. Mr. McCarthy will work in close cooperation with W. W. Fisher, who was recently appointed general manager. Mr. McCarthy is a veteran in this particular line of chemicals, having spent most of his business career in the fat and oil industry. For the past 20 years he has been associated with A. Gross & Co., as vice-president and treasurer. He joins Hardesty & Co. at a time when their expanded fatty acid plant in Philadelphia is getting into full production.

U. S. Rubber Test Chambers

Scientists of the U. S. Rubber Co. have completed construction of hot and cold "torture" chambers to roast and freeze rubber and plastic aircraft parts up to 60 degrees above zero and down to 80 degrees below zero in their search for better materials to withstand extremes of temperature. Inside the chambers are electrically driven contrivances which bend, stretch and otherwise punish the products for many hours in the extreme heat and cold. The cold chamber is refrigerated by means of dry ice immersed in alcohol which is circulated through a radiator. The unit is heavily insulated and the temperature is thermostatically controlled. The oven, heated by electricity, is the circulating air type. It is equipped with regulating and measuring devices to control air temperature, pressure and flow. The volume of air flow and air pressure are regulated by a pressure control valve and inlet and outlet valves, and volume is measured by a rotometer.

Wilson Names New Officers

Charles T. Wilson Co., Inc., New York, N. Y., has announced the appointment of Renato A. Favenza as a vice-president and director of the company. George H. Gremer has been named secretary and director while James H. Gallelly, Jr., has been named treasurer. The former treasurer and a director of the company, George H. Wing, recently passed away.

LEADING SUPPLIERS TO THE RUBBER, PLASTICS AND ALLIED INDUSTRIES ·

CANADIAN NEWS

Additional information has been made available on the alleged existence of combines in Canada's rubber industry. Canadian Combines Commissioner T. D. MacDonald has rejected an argument by the industry that it was "necessarily drawn" into certain combine practices by the government-owned Polymer Corp. at Sarnia, Ont. The rubber manufacturers and merchandisers admitted that they made collective agreements and arrangements regarding the price and supply of synthetic rubber produced by Polymer, but claimed they did so in the national interest because the Polymer Corp. would otherwise have failed.

In effect, the rubber firms argued their operations in this regard were forced on them by the government in an effort to keep the multi-million dollar synthetic rubber plant at Sarnia in operation. Mr. MacDonald's summary of the evidence made it clear that collective arrangements over price and supply were in fact made by the rubber firms with Polymer toward the close of government control over rubber in 1947, and he found "considerations of public benefit" were part of industry's motives.

In addition, however, "the rubber companies had a real personal interest in the continuance of Polymer from the standpoint of emergency supply and control upon the price of crude rubber," Mr. MacDonald wrote. When rubber control ceased in April, 1947, a short supply of natural rubber still existed. J. A. Martin, who had been the government's rubber controller, was engaged by the Rubber Association of Canada to regulate the proportions of natural and synthetic rubber used by the industry. His regulations were accepted by the rubber companies on a voluntary basis.

Gradually the supply of natural rubber improved and the price declined. This raised the problem of Polymer's output; the corporation wanted to know how much the industry would buy. In return, rubber companies wanted to know what price decrease Polymer would make to maintain a competitive relation between the price of synthetic rubber and the price of natural rubber.

On June 4, 1947, the directors of the Rubber Association met with Polymer officials and agreed to take enough synthetic rubber to keep the Sarnia plant out of the red. Polymer, for its part, agreed to lower its price to 16c a pound. Mr. MacDonald quoted the remarks of Mr. Martin at a subsequent meeting to show why the Rubber Association acted as it did. "Mr. Martin pointed out," he wrote, "that the Canadian industry as a whole believed the Polymer Corp. should be kept in operation as an important factor in the national security and as a stabilizer of crude rubber prices."

He concluded that while no objection could be taken to the arrangements made with Polymer, there were no grounds for the companies' arguments that these arrangements led or contributed to any of the other alleged offenses complained of in his report.

Record sales and earnings reported by the Polymer Corp., Ltd., for the year ended March 31, 1952, are attributed to the high rate of business activity and the substantial rise in the price of natural rubber which has reflected in increased sales of synthetic. In his report to Defense Production Minister C. D. Howe, J. D. Barrington, president and managing director of the Crown company, pointed out that had the corporation been liable for payment of income tax, the net profit would have been reduced to approximately $3,950,000. The company's financial structure was recently re-arranged whereby plant and assets were transferred from the Crown to the company. Under this new arrangement, the company will pay federal income taxes.

Polymer is reported to be meeting the entire Canadian requirement for synthetic rubber. This represents about one-half of the new rubber consumed. Any lowering of synthetic prices by the United States would have a strong impact on the company's sales position. Any rise in production in the United States above requirements would also result in greater competition in the export market.

The general sales outlook should be viewed with restraint, said Mr. Barrington. Should there be a further drop in the price of natural rubber or some more stringent currency restrictions, there might be difficulty in maintaining previous sales tonnages to Europe. Competition will also be encountered from Germany and the United States. Long-range forecasts by the rubber industry indicate that the world demand will probably increase faster than synthetic plants will be built, he declared.

Although the world supply situation may create fluctuations in demand, it is expected that the company can maintain a high level of production. However, in the long-term market conditions, it is highly probable that the corporation's most profitable ventures in the years to come will be in the development of specialized products. These products will have applications which will not be directly competitive with natural rubber nor will they be affected by its price. Polymer, said Mr. Barrington, must pursue its research for new products, develop its present products and maintain its energetic sales policy.

B. F. Goodrich Rubber Co., Ltd., Kitchener, Ont., has been appointed exclusive Canadian distributor of Ace Truck Fender Flaps. Ace flaps have been extremely successful in meeting the requirements of the many states where splash guards are now required and are said to be proving very durable and satisfactory for the truck operators. Their many benefits have created a considerable demand in Canada.

"Chemistry Serves Western Canada" is the theme of the Western Regional Conference of the Chemical Institute of Canada scheduled for October 24-25 in Saskatoon, Sask. The program will include three technical sessions and field trips. Among noted scientists who will address the conference are Dean Henry Eyring of the University of Utah and Professor G. W. Wheland of the University of Chicago. Details on the conference may be secured from Dr. A. B. Van Cleave, secretary of the Organizing Committee, at the University of Saskatchewan, Saskatoon.

More Certificates of Necessity

The Defense Production Administration has issued a new list of approved Certificates of Necessity for accelerated tax amortization on new or expanded defense facilities. Certificates issued recently include:

Cabot Carbon Co., Bayou Sale, La., $370,050 for carbon black.

General Tire & Rubber Co., Wabash, Ind., $140,000 for gas mask components.

Spencer Rubber Products Co., Manchester, Conn., $14,000 for molds to manufacture molded rubber goods.

B. F. Goodrich Co., Miami, Okla., $542,059 for military tires.

G. A. Mosites Co., Fort Worth, Texas, $48,169 for rubber and plastic linings for tanks.

Continental Carbon Co., Hobbs, New Mexico, $1,010,500 for carbon black.

Garlock Packing Co., Palmyra, N. Y., $160,460 for mechanical seals for packings for military end-items, and $72,374 for packings and gaskets for military end-items.

Firestone Tire & Rubber Co., Pottstown, Penn., $961,500 for butadiene and butylene.

Dow Chemical Co., Midland, Mich., $136,400 for butadiene, and at Freeport, Texas, $3,480,000 for butadiene.

Mansfield Tire & Rubber Co., Mansfield, Ohio, $148,900 for heavy-duty military tires.

Union Carbide & Carbon Corp., Seadrift, Texas, $66,300,474 for polyethylene and ethylene oxide, and at Los Angeles, Calif., $36,323,000 for polyethylene.

Carbide & Carbon Chemicals Co., Texas City, Texas, $893,300 for butadiene.

Tyer Rubber Building Factory

Tyer Rubber Co., Andover, Mass., recently broke ground for a new factory building in Andover. The new structure will be a two-story, 75 by 240 feet, giving a total of 36,000 square feet of floor space. It will be located north of and adjacent to the existing factory buildings in Andover. It is planned that the new space will be used partly to provide needed additional facilities for the manufacture of special rubber products and partly to house an improved and more complete laboratory. The new building should be ready for occupancy by the end of 1952.

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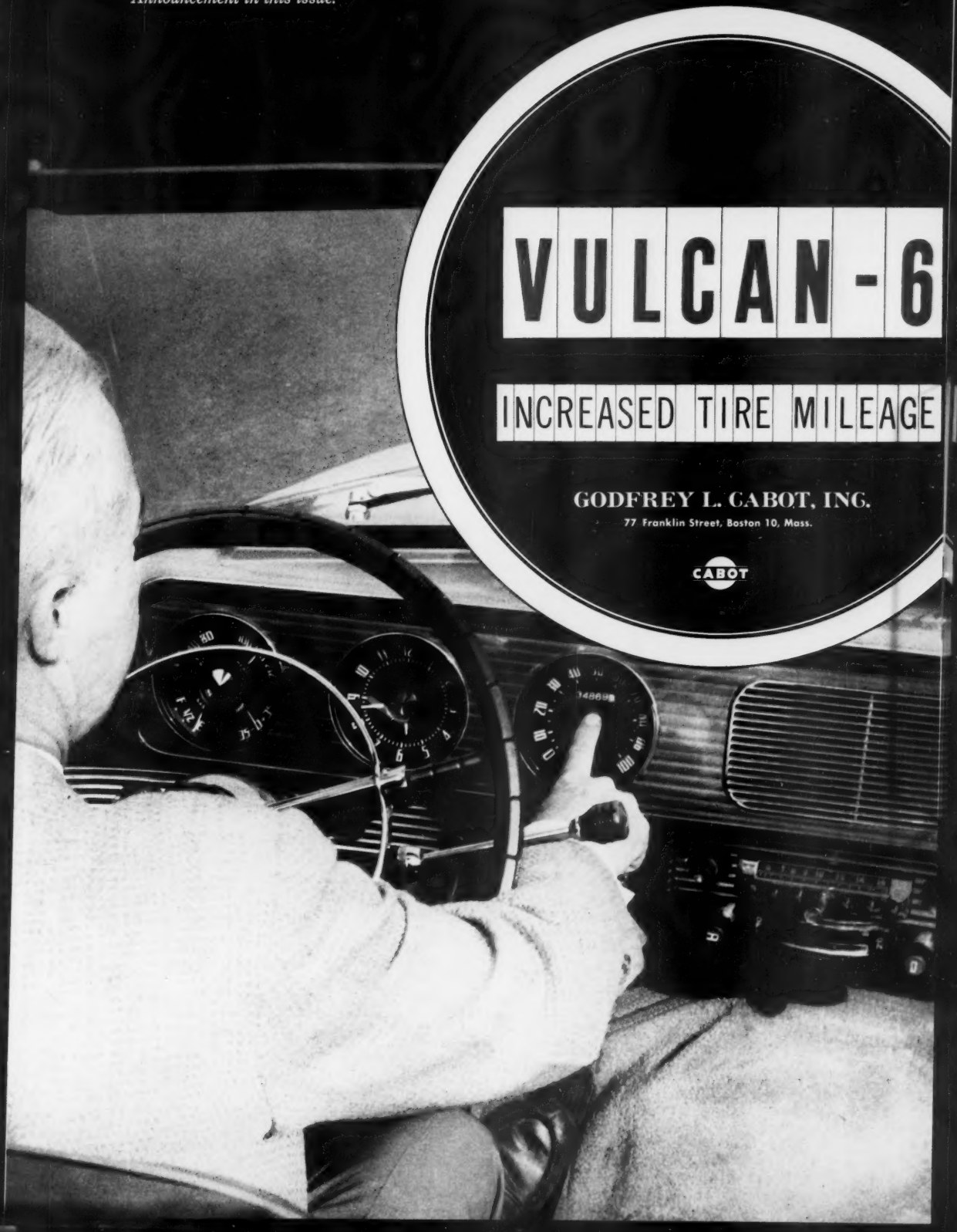


OBITUARIES

Douglas S. Dilts

Douglas S. Dilts, president of the H. N. Richards Co. of Trenton, N. J., died on June 11 in Mercer Hospital in that city. He was 57 years old. Born in Lambertville, N. J., Mr. Dilts was graduated from Cornell University in 1917. A veteran of World War I, Mr. Dilts headed the Mercer County Selective Service Board during

World War II. A 33rd degree Mason, Mr. Dilts was also active in local Red Cross affairs. He was a member of the board of directors of the Trenton Chamber of Commerce, past-president of the Pennington, N. J., Lions Club and a member of the Trenton Kiwanis Club and the Cornell Clubs of New York and Trenton. Funeral services were held on June 14 in Pennington with burial in Pennington Cemetery. He is survived by his wife and two daughters.

Robert W. Snyder

Robert W. Snyder, retired chief of the Machine Development and Design Department of the Goodyear Tire & Rubber Co., died on June 19 in St. Petersburg, Fla. He was 69 years old. He had been associated with Goodyear for 38 years before retiring in 1949. A Mason, Mr. Snyder had been seriously ill for more than a month. Services were held in Cuyahoga Falls on June 25 with interment in Rose Hill Burial Park. He is survived by his wife, a son and a daughter.

Byron V. Crane

Byron V. Crane, former chemical editor of the *Journal of Commerce* and former assistant editor of the *India Rubber World*, died suddenly on June 20 in High Prairie, Canada. At the time of his death, Mr. Crane was editor and publisher of the *Mullan News* in Mullan, Idaho. A graduate of the University of Wisconsin, Mr. Crane saw Army service in World War II. Funeral services were held in Greenwich, Conn. on June 30.

George L. Hammond

George Lewis Hammond, head of the Advisory Service on Plastics and Rubber of the British Ministry of Supply, died in Croydon General Hospital, Croydon, England on June 13. He was 45 years old. He was educated at Ardingly College and graduated at King's College, London, in 1932. Late the following year he joined the staff of the Research Association of British Rubber Manufacturers at Croydon where he remained until 1937. In the same year he became associated with the War Department and worked in the rubber laboratory at Woolwich Arsenal. In 1944 he was transferred to the department of the Director of Chemical Research and Development in the Rubber Section of the Ministry of Supply and in 1951 he was appointed to the position of chemist in charge of the Advisory Service on Plastics and Rubber, Ministry of Supply. Mr. Hammond was the Ministry's representative on the International Standards Organization for Rubber (ISO 45) and on several British Standards Institution Committees. For many years he had taken a keen interest in the work of the Institution of the Rubber Industry and was a member of the council at the time of his death. He served as chairman of the London Section of IRI for two years and also for two years as honorary chairman. Mr. Hammond also served as a part-time lecturer at Northern Polytechnic. A cremation service was held in Croydon on June 19. He leaves his wife and three young sons.

John A. MacMillan

John Alwyn MacMillan, director and former president and chairman of the board of the Dayton Rubber Co., died on June 7 in Dayton, Ohio. He was 79 years old. A Canadian by birth, Mr. MacMillan later became an American citizen. He was educated in the public schools of Canada and was graduated from Prince of Wales College. Mr. MacMillan began his career as a school teacher and later was associated with the Equitable Life Insurance Society of the U. S., W. C. Lathrop and Co., and the Brinkhaus Investment Co. In 1908, Mr. MacMillan moved to Dayton and joined the Dayton Rubber Manufacturing Co., bringing with him his invention for an airless tire which soon went into production. He became general manager and president of the company in 1916 and held that office for 20 years. In 1936, he was elected chairman of the board of Dayton Rubber, a post he held until 1945. He served as a director of the company until his death. During his career, Mr. MacMillan served with many civic groups and was director of several civic and national organizations. Funeral services were held on June 10. Mr. MacMillan is survived by his wife.

Thomas N. D. Mace

Thomas N. D. Mace, vice-president of the Pequanoc Rubber Co., died suddenly at his home in Butler, N. J., on June 16, following his second serious heart attack in several years. Mr. Mace was born in England and came to the United States when he was six years old. He served in World War I, having returned to Great Britain in 1916 to serve in the British Army. In 1926 Mr. Mace began his career at Pe-

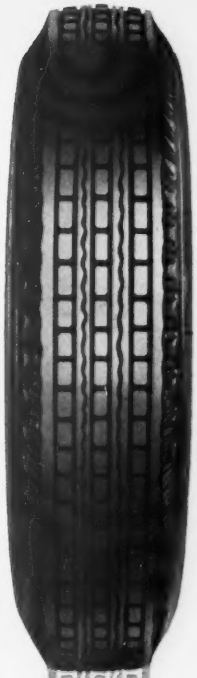
quanoc Rubber as a mechanical engineer, having worked previously at the Farrel-Birmingham Co., Ansonia, Conn. Several years later he became assistant superintendent and in 1939 became superintendent. On April 28, 1949, he was elected president of the company only to resign later that year because of ill health. He served as vice-president in charge of production from that time until his death. Active in civic affairs, Mr. Mace served as Mayor-without-salary of Butler, N. J., from 1942 to 1947. He is survived by his wife and daughter.

Arlington E. Stanton

Arlington E. Stanton, vice-president of the American Zinc, Lead & Smelting Co., St. Louis, Mo., died on June 10 in that city. Mr. Stanton began his career with the Lanyon Zinc Co., Caney, Kan., in 1906, the year in which that company was acquired by American Zinc. He served at American Zinc properties at Caney and Dearing, Kan., until 1911, when he was transferred to the St. Louis and East St. Louis operations of the company. In 1941, Mr. Stanton was elected vice-president of American Zinc, in which post he served until his death. He was a member of the American Zinc Institute and a Mason. He is survived by his wife, his son and a daughter.

K. K. Kantzer

K. K. Kantzer, Pacific Coast manager of the Associated Lines Division, B. F. Goodrich Co., died on June 6 at Huntington Memorial Hospital in Pasadena. A native of Lakeville, Ohio, Mr. Kantzer had been associated with Goodrich for 42 years. He started as a tire adjuster in Akron in March, 1910. He held the post of Pacific Coast Manager since 1928. Mr. Kantzer is survived by his wife and two sons.



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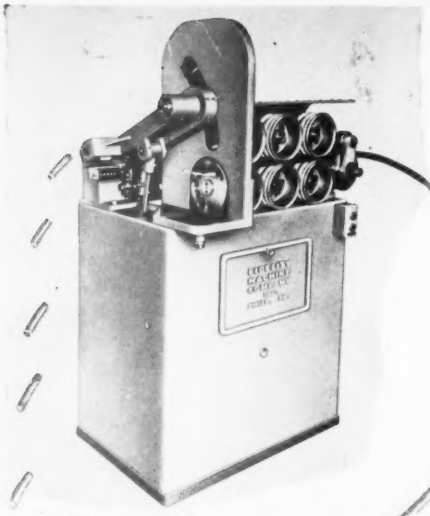

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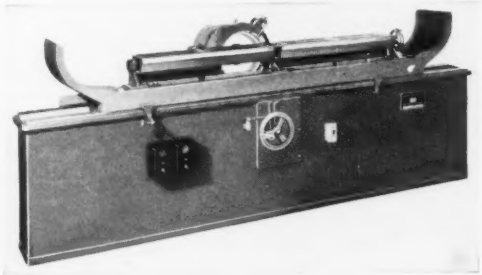
NEW EQUIPMENT

NL Medium Duty Knife Grinder

A new medium duty knife grinder, particularly adapted to the fast, accurate care of many types of knives, including trimmers and stock cutter knives, has been introduced by Samuel C. Rogers & Co., 183 Dutton Ave., Buffalo 11, N. Y. Called the NL Grinder, it incorporates the latest electric table drive including special control switches and 1½ hp special reversing motor. Table speeds are variable and table reversals are smooth and shock free. All grinding pressures are absorbed by the heavy base through the carefully machined combination of flat and angled "V" ways. These "V" ways, too, because of the reciprocating table action, are self-aligning to provide years of accurate service.



The unit includes as standard equipment a 3 hp heavy-duty ball bearing grinding head motor. The wheel is a 14-inch diameter segmental type and is moved to the work automatically in desired increments. The knife bar is of the box type with two faces to handle either thick or thin knives. A quick set-up device can be provided. Any angle can be easily set for bevel grinding. The grinder is available in 6 standard sizes to handle knives up to 60, 66, 72, 90, 102 and 110 inches in length. Its weight ranges from 1800 to 3500 pounds.

General Electric Tachometer Kits

New tachometer kits, containing all the components necessary to provide instantaneous and permanent records of machine performance at a central location, and particularly suited for use in the continuous process industries, such as rubber, have been announced by the Meter and Instrument Department, General Electric Co., Schenectady 5, N. Y. Central location of the new kits' recording equipment eliminates time-consuming production-line trips by supervisory personnel, permitting up-to-the-minute checks of operating equipment. Permanent recording feature aids preventive maintenance scheduling, and prevents excessive manufacturing losses by automatically shutting down machinery in case of breakdowns. Four kits are available in the new line. A typical installation would include a d-c tachometer generator, a tachometer indicator, a switchboard-type tachometer recorder, and (where a continuous web of material is produced) a web-break detector.

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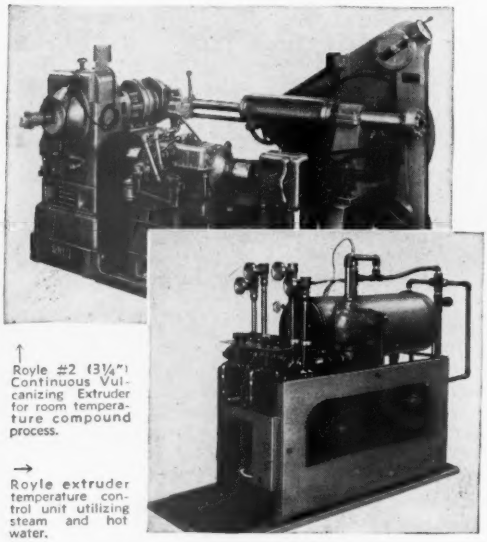
To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

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Dusenbery Hydraulic Core Jack

The problem of driving cone type chucks into mill roll cores on unwind shafts is said to be solved by a new hydraulic core jack recently developed by John Dusenbery Co., Inc., Verona, N. J. The two-ton force of the ram can drive a cone into the core of a mill roll far more effectively than the impact of a heavy sledge

hammer or most types of screw jack arrangements. This primary advantage, according to the company, is gained with less operator fatigue, with no danger of injury to equipment, and in less time than by former methods. Field tests are said to have shown that use of the new jack completely eliminates loosening and damage to the mill roll core while unwinding. The standard core jack featured by the company is available to fit unwind shafts up to 2⅜ inches diameter. Sleeves are available to adapt one jack assembly for several shaft diameters. The equipment can be clamped in working position with three screws without any modifications of existing unwind shafts. However, set-up time can be reduced to a minimum by through-drilling the payoff shaft for a ½-inch diameter pin to hold the body of the core jack in working position. Standard equipment includes a hand pump with hose and couplings, ram and ram housing. Sleeves for adapting the ram housing to more than one size of unwind shaft can be secured as extra equipment.

Velan SP Steam Trap

The Velan SP Steam Trap, a piston-operated steam trap for applications where exceptionally large capacities are required, has been introduced by the Velan Engineering Co., 1 Exchange Place, Jersey City, N. J. The new trap, being comparatively small and 3 to 10 times lighter than other designs of similar piston-operated units, has a 2-inch orifice with tremendous capacities. It combines the Velan four-operation principle, i.e., air-vent, strainer, condensate discharge and check valve. The air discharge capacity is said to be much larger than that of other designs. All moving parts are made from stainless steel, including the piston plunger, piston liner and spring. The strainer is made from heavy-duty phosphor screen for pressures up to 250 psi and from stainless steel for other pressures.

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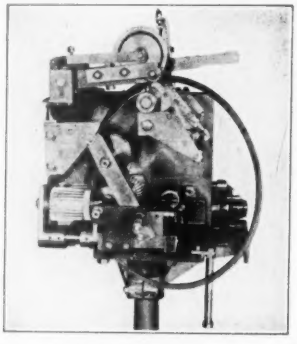

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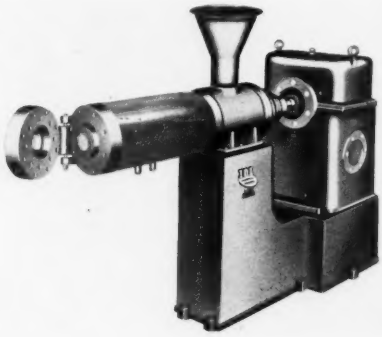
Allen Extrusion Machines

The Allen Extrusion Machines, now being produced by the Allen Extrusion Machine Division of Industrial Ovens, Inc., 13825 Triskett Road, Cleveland 11, Ohio, are designed to handle such materials as polyvinyls, acetates, butyrates, nylon, marlon and polyethylene, and such products as rubber or plastic wire jackets, rubber inner tubes, pneumatic tire treads, monofilaments and



plastic films, and extruded sections in general. All of the units feature heavy-duty thrust housings, streamlined die heads, high torque drives, rugged design and construction, and special screw designs. They are designed for electric, oil or steam heating, and the company is equipped to provide a wide range of proven accessories.

Practical features of the Allen rubber extruders include the following: Extrusion and feed chambers designed to eliminate entrapped air; tuber units equipped with interchangeable heads, readily converted to strainer head operation by means of breech lock or hinged heads; screw flutes designed for maximum stock delivery with minimum horsepower use; screws may be removed from driving spindle without dismantling the complete unit; cast alloy thrust housings; forged steel thrust sleeves; heavy fabricated base plate; heavy-duty, roller thrust bearings, all oversize for heavy production performance, and right or left hand drive design.

The numerous features of the Allen extrusion machines for plastic wire insulating include these: Heavy plate base, strongly ribbed for maximum rigidity and strength; all drives and gear reducer housing mounted in one heavy fabricated base unit; extruder screws are hardened, corrosion-resistant, of single or double flight type, bored and fitted for liquid cooling or heating; main extruder housings are of heavy cast alloy; driving spindles are made from heavy steel forgings; drives are double reduction type with continuous herringbone gears or heavy-duty worm gear drives; heads may be fastened by a bolted, lever-operated breech lock or cam or gear operated opening mechanisms; designed for either right or left hand operating drives; readily adaptable to film extruding, wire covering, tubular shapes and profiles.

In addition to supplying these new extruders and all necessary accessories, the company is also furnishing replacement stock screws and extrusion and straining heads for all makes of extrusion machines.

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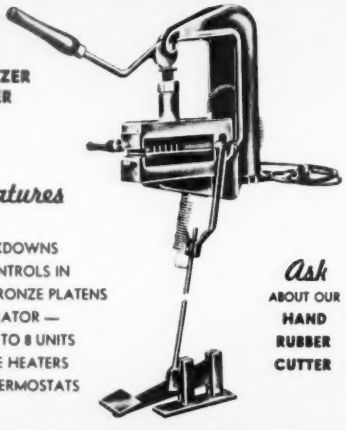

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Temperature-optical transmission studies and automatic determination of melting point, solidification point, softening point, dehydration point, etc., can now be accomplished rapidly, accurately, and reproducibly by means of the Aminco-Furst Meltometer, a new instrument recently introduced by the American Instrument Co., Inc., Silver Spring, Maryland. The unit performs many determinations automatically, minimizes personal error, and reduces the variables of the determination to reproducible constants; thus, it opens new fields and finds many new applications. For instance, it measures sample size for duplication, and permits, for the first time, obtaining a reference value on amorphous materials with "no melting point."

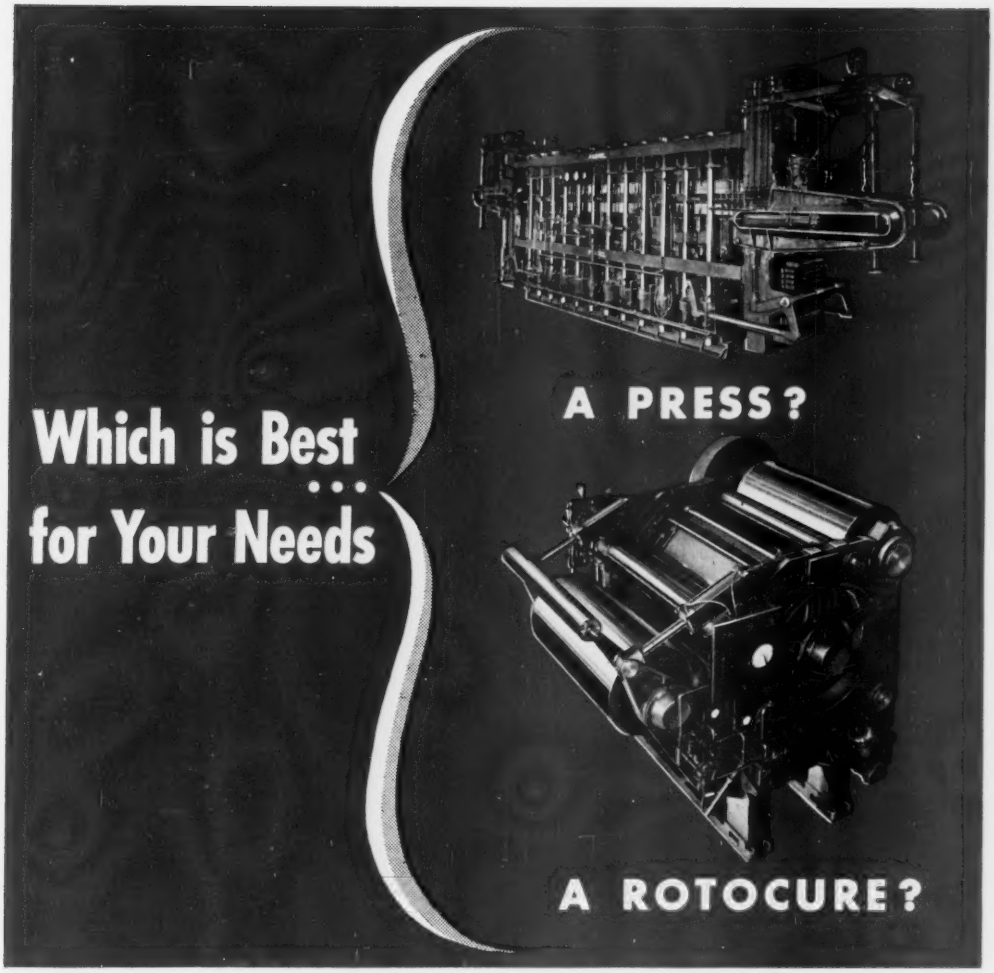
Transmission and temperature of the sample are indicated or recorded continuously. A maximum of 15 minutes is required for making a melting point determination, but only one minute is required for the operator to insert the sample and set the controls—the instrument does the rest. Measurements can be made by technicians unskilled in this type of work. Only microscopic amounts of sample are required for test. Upon completion of a test, the sample will be in a solid state for observation, storage, or repeated tests.

The maximum range of the Meltometer is 0° to 500° C., and its accuracy is 1% of the pyrometer scale. For increased accuracy, reduced temperature ranges, with zero suppression, can be selected.

A special three-way solenoid valve for especially hazardous applications, so designed that it "fails safe" under all conditions, is a feature of the new line of **Pilot-Master Valves** recently introduced by the Hannifin Corp., 1151 So. Kilbourn Ave., Chicago 24, Ill. The principal use of the new valves is expected to be for the control of clutch and brake cylinders on mechanical presses, where the failure of a valve to reverse when the solenoid is de-energized might result in serious injury to the press operator.

Screen Tests?

SEE PAGE 438



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REVIEWS

BOOKS

Rubber Technology. Edited by R. C. W. Moakes and W. C. Wake. Printed in Great Britain. American edition published by Academic Press, Inc., 125 East 23rd St., New York 10, N. Y. 5½ x 8½ in. 200 pp. $4.30.

In a commendable effort to acquaint the British rubber industry with some of the more recent advances in rubber technology, the Research Association of British Rubber Manufacturers, more familiarly known by its initials, R.A.B.R.M., organized a Summer School in Rubber Technology at Croydon last year. The lectures given at the "school" were of so high a quality, that it was soon realized that a more permanent record should be made available. Accordingly the lectures given at the 1951 session were compiled into this book.

Although the present work is somewhat limited in scope, and it might be argued that it lacks the inner coherence that a single author would achieve, it is a most welcome addition to the rubber literature, since it covers fields not adequately surveyed in recent years. The rubber industry has long needed a comprehensive text book, a point made by the editors of the current work in their introduction, and even though limited in scope the book under review fills at least part of the existing gap. Actually, it will serve as a book of reference on compounding and on the instrumentation of the rubber testing laboratory.

Seven lectures were given at the 1951 summer session, each of them by a recognized authority in his field, and all of them are included in the book. The subjects covered, and their authors, are as follows: (1) Technology in 1951 and After, by J. R. Scott; (2) Latex: From the Tree to the Finished Article, by W. J. S. Naunton; (3) Recent Developments in Compounding, by R. C. W. Moakes; (4) The Significance of New Aging Tests, by J. Mann; (5) Developments in Testing Instruments and Test Methods, by A. L. Soden; (6) Resources of the Woven Fabric Designer, by W. E. Morton; (7) Statistical Techniques in Rubber Technology, by W. C. Wake.

The book includes a preface by Mr. H. Rogers, Chairman of the Research Association of British Rubber Manufacturers, which briefly outlines the activities of that aggressive organization. There is also a comprehensive, cross-referenced subject index, and a list of abbreviations used in the text.

•

Industrial Process Control by Statistical Methods. By John D. Heide. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 297 pp. $6.

A good deal is heard these days concerning the application of statistical methods to the problems of industry. Too frequently the subject is confused with that of quality control, which is also proving itself in industry. The author of the present book divides statistical methods as applied to industry into three definite categories, the first concerned with control of industrial products and processes during manufacture, the second covering the inferences which can be drawn about a lot or a series of lots of material by examination of a sample or samples drawn therefrom, and the third pertaining to the design and analysis of experiments. Wisely, he has confined the data in this book to that phase of industrial statistics pertaining to the direct control of the industrial process.

The book is essentially a "how to" work. It tells how to present process data graphically, how to construct frequency histograms and curves, how to estimate factory process distributions and their relation to process control, how to design and construct control charts, and how to tell the re-

liability of test results. Exercises appear at the end of each of the 14 chapters so that the reader can himself determine the value of the data presented, and apply the information to his own particular industrial problems.

There are several special features concerning this book, which is actually a practical manual. For example, it is the first book exclusively devoted to the subject of industrial process control. Every problem cited in the book is actually a case history with which the author is familiar. The author has leaned on simple arithmetic and algebra rather than on complicated calculus. For these reasons adequate training is provided both in the statistical methods required and in the practical and technical problems of applying them to factory processes. Mr. Heide, the author, has been associated with the research and development department of the U. S. Rubber Co. as an industrial-statistical analyst since 1942.

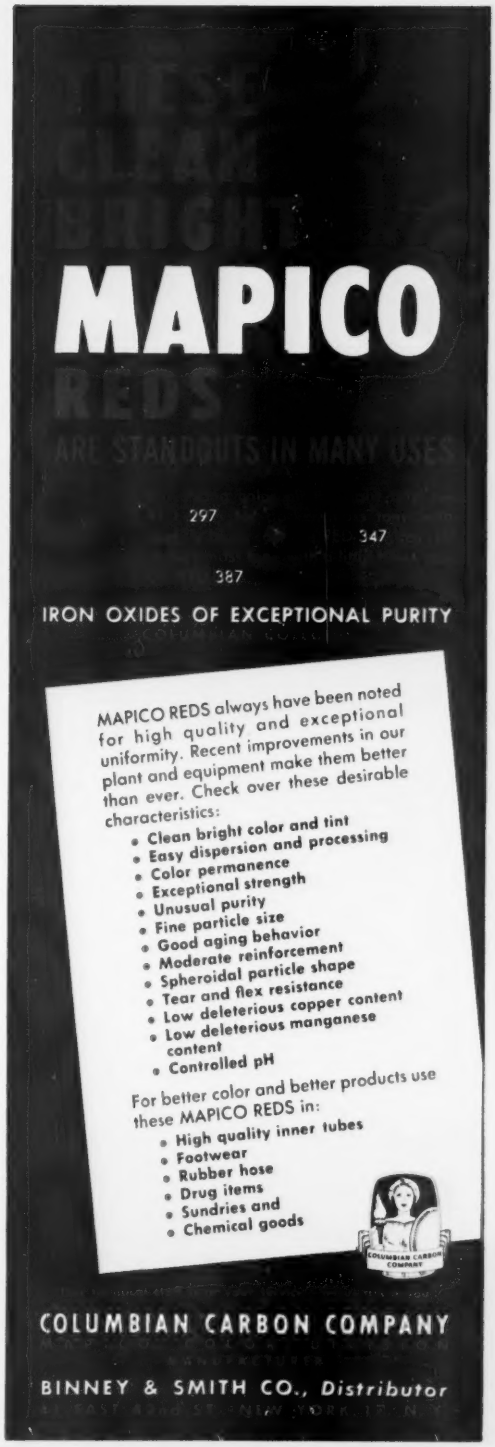
•

The Physical Chemistry of Surface Films. By W. D. Harkins. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 413 pp. $10.00.

The accredited author of this book died in March, 1951, almost immediately after he had finished the manuscript. The fact that the book was brought to a publication stage is a tribute to not only the late Dr. Harkins, but to his many friends who made it possible. The book covers all the fundamental pioneer work accomplished by Dr. Harkins on the mechanism of liquid-liquid films and interfaces, surface tension, emulsification, energetics of surfaces, the nature of films on liquid and solid subphases, and properties of solutions of long-chain electrolytes. An introductory study of the electric layer, written by E. M. Verwey, is also included.

Though some of the material has appeared in earlier publications, particularly in the comprehensive series of volumes edited by Jerome Alexander under the title of "Colloid Chemistry," the volume should serve as an excellent guide to the many advances in emulsion technology, including emulsion polymerization, on which Dr. Harkins was working at the time of his death. Much of the information is published for the first time.

The book contains six chapters, as follows: (1) The Nature and Energetics of Surfaces; (2) Films on Liquids; (3) Films on Solids; (4) Properties of Soap Solutions; (5) Mechanism of Emulsion Polymerization; (6) The Role of the Electric Double Layer in the Behavior of Lyophobic Colloids. The latter chapter is the contribution of Mr. Verwey. There is also an extensive introduction by T. F. Young and a brief foreword by Peter Debye. A subject index is included.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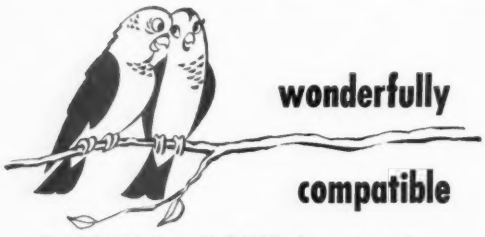

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REVIEWS (CONT'D)

Vinyl and Related Polymers. By Calvin E. Schildknecht. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9½ in. 724 pp. $12.50.

Devoted to an exhaustive discussion of the vinyls and related polymers, this book is aptly subtitled: "Their Preparations, Properties, and Applications in Rubbers, Plastics, Fibers, and in Medical and Industrial Arts." Emphasizing the practical chemistry and physics of polymerization and polymers, the basic inventions, the methods of synthesis, the advantages, and the limitations of the products, some idea of the scope of the book can be realized from the fact that more than 4,000 separate references from 1835 to the second half of 1951 are given. The amazing growth of the vinyl plastics is truly documented in this valuable addition to the technical literature.

In order that a wider circle of readers may find the book understandable, the author has written the first chapter as an introduction to polymer science. In keeping with this end, he has kept theoretical and mathematical aspects to the minimum, and uses simple name forms wherever possible. Special attention has been given to recent developments and to fields with which the author has had most experience, such as styrene copolymers, vinyl chloride copolymers, acrylic fibers and plastics, fluoro-polymers, polyethylene, nitrogen-vinyl polymers and polymers prepared by ionic reactions at low temperatures. Dr. Schildknecht is associated with the Celanese Corporation of America.

The book has 14 chapters in all and a subject index. Abbreviations of publications frequently cited, companies and organizations cited, and dates of British, French, German and U. S. patents are included in an appendix.

BOOKLETS, CATALOGS, etc.

Life-Line Proved Economy. (Booklet No. B-4769). Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Penna. 8½ x 11 in. 36 pp.

Over 100 case histories of outstanding applications of Life-Line motors are depicted in this booklet. Picked from more than 750,000 Life-Line motor applications in existence today, these case histories represent practically every phase of industry. Most of the histories are illustrated, and each gives the particular application problems involved, the motor choice for the job, and the results. In more than half the cases, the geographic location and the user's name are included.

•

Huber Carbon Blacks and Electrical Conductance. J. M. Huber Corp., 100 Park Avenue, New York 17, N. Y. 8½ x 11 in. 8 pp.

The purpose of this bulletin is to show some of the practical aspects of various types of carbon black in relation to electrical conductivity in the most commonly used polymers. The bulletin describes and illustrates the testing procedure, lists the test formulae and describes the effect of carbon black loading and dispersion on electrical conductance. Particular attention is paid to Aromex 115, the company's new super-abrasion furnace black.

•

Processing Equipment. Farrel-Birmingham Co., Inc., Ansonia, Conn. 6 x 8¾ in. 8 pp.

Illustrated and brief descriptions of the principal machines manufactured by the company for the processing of rubber and plastics are found in this booklet. Many of these machines incorporate new refinements which are elaborated upon. Among the units described are Banbury mixers, rubber and plastics calenders and mills, plasticators, pelletizers, tubing and straining machines, strainer-extruders, molding presses, the Rotocure, asbestos sheeters, hose machines and crackers.

Ortho-Ethylnitrobenzene and Ortho-Ethylaniline. (Technical Bulletin No. O-79) Organic Chemicals Division, Monsanto Chemical Co., St. Louis 4, Mo. 8½ x 11 in. 12 pp.

This technical bulletin reviews the properties and reactions of ortho-ethylnitrobenzene (1-ethyl-2-nitrobenzene) and ortho-ethylaniline. Some of their specific uses as intermediates for the manufacture of rubber chemicals, dyestuffs, pharmaceuticals, etc., are pointed out, while applications in other fields are suggested. Other chemicals considered are ortho-nitroacetophenone, obtained by the liquid-phase air oxidation of ortho-ethylnitrobenzene, and ortho-aminoacetophenone, obtained by the selective reduction of ortho-nitroacetophenone. In addition to a brief listing of general properties and information on handling, the bulletin also includes a bibliography of references.

•

The Effect of Stearic Acid on the Physical Properties of Tire Tread Compounds Produced from Various Types of GR-S Pigmented with High Abrasion Furnace Black. J. M. Huber Corp., 100 Park Avenue, New York 17, N. Y. 8½ x 11 in. 8 pp.

This technical report describes the effect of stearic acid on the physical properties of GR-S tire tread compounds, pigmented with high-abrasion furnace black. The GR-S polymers investigated included "cold" rubber, "hot" rubber and an oil-extended polymer. Complete test recipes for each type and tables comparing original properties as well as properties after aging are presented. The magnitude of the effects produced has been found to be dependent on the type and amount of pigmentation and on the type of acceleration employed.

•

Opportunities for All. Technical Cooperation Administration, Department of State, Washington, D. C. 8½ x 11 in. 60 pp.

This report was prepared for the Technical Cooperation Administration by Richardson Wood and Co. and reprinted by TCA for the information of private investors. Its purpose is to help spread knowledge of the opportunities for closer teamwork between American business and the Point 4 Program in helping the people in the underdeveloped countries in their efforts to achieve greater social, economic, and industrial progress. This report shows how government effort and private capital can work together in sharing American skills and knowledge with other countries in their efforts to help themselves.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JULY 8, 1952

Natural Rubber

Free trading in natural rubber was officially restored on July 1 and the trade did not expect world rubber markets to move very far in either direction for the immediate future. This is predicated on the belief that there is not likely to be any excessive pressure on the markets for the time being. With many manufacturers in the United States closing for the usual vacation periods, and in view of the uncertainty over the natural rubber market and what GSA may or may not do with regard to stockpile rotation, there is not likely to be an urgency in the demand for natural rubber in this country.

World production of natural rubber in the first half of 1952 is expected to reach 840,000 tons, compared with 972,500 tons in the first half of the preceding year and 907,500 tons in the last half of 1951. Consumption of natural has been estimated at 740,000 tons, an improvement over the 695,000 tons used in the second half of 1951 when U. S. restrictions were at their peak.

Today's quotations for the outside market, London and Singapore follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.30½
August	.29¼
September	.29½
Thin Latex Crepe:	
Spot	.38½
February	.38½
Thin Brown Crepe, No. 2	.23½
Smoked Blankets	.22½
Flat Bark Crepe	.17½

London Market

(Standard Smoked Sheets)

August	30.92 - 31.21
October-December	29.75 - 30.04

Singapore Market

(Standard Smoked Sheets)

August	28.66 - 28.77

Closing Rubber Prices on New York Commodity Exchange

(No. 1 R.S.S. Contract)

FROM JUNE 6 TO JULY 8

June	Spot	Sept.	Dec.	Mar.	May	Sales
6	——	28.00	26.70	26.10	25.70	49
7	——	——	——	——	——	——
8	——	——	——	——	——	——
9	——	27.85	26.60	26.10	25.70	25
10	——	28.50	27.40	26.85	26.45	95
11	——	28.60	27.35	26.75	26.35	74
12	——	29.10	27.65	27.15	26.75	100
13	——	29.55	28.00	27.10	26.80	138
14	——	——	——	——	——	——
15	——	——	——	——	——	——
16	——	29.00	27.50	26.70	26.40	40
17	——	29.50	28.25	27.30	27.00	135
18	——	29.35	28.05	27.15	26.85	156
19	——	29.70	28.40	27.40	26.95	77
20	——	30.50	28.95	27.95	27.45	151
21	——	——	——	——	——	——
22	——	——	——	——	——	——
23	——	31.00	29.30	28.20	27.70	40
24	——	31.25	29.25	28.00	27.50	95
25	——	31.75	29.75	28.25	27.50	72
26	——	32.00	30.00	28.55	27.85	186
27	——	31.90	29.85	28.35	27.75	70
28	——	——	——	——	——	——
29	——	——	——	——	——	——
30	——	31.25	29.25	28.00	27.30	71
July						
1	32.25	31.10	29.00	27.75	27.00	49
2	32.25	31.30	28.90	27.70	27.00	91
3	31.00	30.60	28.30	27.10	26.30	65
4	——	——	——	——	——	——
5	——	——	——	——	——	——
6	——	——	——	——	——	——
7	31.00	30.30	28.00	26.85	26.15	38
8	30.25	29.80	27.80	26.70	25.95	47

Scrap Rubber

Activities in the scrap rubber market continue at the low levels evident during the past few months. It is believed in the trade that OPS ceilings on scrap rubber may be suspended in the near future. Prices on all grades of scrap are being considered as nominal. The prices below represent ceilings established by the Office of Price Stabilization:

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	.02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

According to preliminary reports by the U. S. Department of Commerce, 122,050 tons of reclaimed rubber were consumed in the first five months of 1952. This compares with the 160,501 tons consumed in the first five months of the preceding year. It is felt in the trade that the recent removal of controls on rubber by the government may prove helpful to reclaimers. OPS-established ceiling prices for reclaimed rubber follow:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09¼
Fourth Line Whole Tire	.08¾
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24¼
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

Trade sources advise that there has been a moderate quickening of activity centering about chafer fabrics although the general market for cotton tire fabrics has been at fairly nominal levels. It is expected that these general conditions will continue for the months immediately ahead. Prices for fabrics and chafers have been somewhat revised to more accurately picture the current market, as follows:

Standard, Peeler, 12/4/2	lb.	.85
Extra Staple, Peeler, 12/4/2	lb.	.91

Chafers

14.4 oz. (per square yard)	lb.	.84
9.25 oz. (per sq. yard)	lb.	.78½
11.65 oz. (per sq. yard)	lb.	.75
8.9 oz. (per sq. yard)	lb.	.80½

Cotton

The price of middling uplands on the New York Cotton Exchange has swung in a range of 1.55c since our last report (June 5), high for the period being 42.15c reached on June 20, and low being 40.60c reached on July 3 and 8. The average price for middling uplands for the month of June was 41.31c based on 21 trading days. This compares with an average of 39.68c in May.

A 17,000,000 bale cotton crop could be produced in 1952 with a 15% decrease in acreage, the U. S. Department of Agriculture declared recently. The report was part of a survey of the nation's agriculture potential if high production was needed. The department's survey assumes average weather, favorable prices and availability of such things as fertilizer and machinery. To produce such a crop in the indicated acreage, yield per acre would be increased to 339 pounds, compared to 262 pounds in 1951, and the 1946 average of 270 pounds. This would be done, the report points out, by increased fertilization and the use of labor-saving and other devices.

Cotton exports so far this season total 5,594,729 bales compared with 3,987,831 last year. There have been recent large authorizations made to both Italy and Germany for the purchase of American cotton for delivery through the balance of this year.

New crop reports have been generally favorable, indicating a crop prospect of 15,550,000 to 16,250,000 bales, according to private reports. While the conditions at the moment are good, July and August are traditionally critical growing months. The acreage reports range from 26,000,000 to 26,750,000 acres.

Quotations for middling uplands on the Exchange follow:

	June 5	July 8		
	Close	High	Low	Close
July	39.65	40.25	40.00	40.07
Oct.	36.92	37.25	36.95	36.99
Dec.	36.64	37.01	36.71	36.75

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.465 - .475
Butaprene NL	.475 - .485
Butaprene NAA	.515 - .525
Butaprene NXM	.550 - .560
Chemigum 30N4NS	.500 - .510
Chemigum 50N4NS	.500 - .510
Chemigum N3	.580 - .590
G-E Silicone Rubber (compounded)	3.20 -4.40
G-E Silicone Gum (not compounded)	—— -5.00
GR-I	—— - .2075
GR-S	—— - .230
Hycar OR-15	.580 - .590
Hycar OR-25	.500 - .510
Hycar OS-10	.550 - .560
Neoprene Types CG and AC	—— - .500
Neoprene Type E	—— - .650
Neoprene Types FR and KNR	—— - .800
Neoprene Type GN	—— - .380
Neoprene Type GN-A	—— - .380
Neoprene Type RT	—— - .400
Neoprene Type S	—— - .380
Neoprene Type W	—— - .400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	2.35 -4.40
Thiokol Type A	—— - .470
Thiokol Type FA	—— - .640
Thiokol PR-1	—— - .950
Thiokol Type ST	—— -1.000

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS										RE-EXPORTS		TOTAL NET IMPORTS
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule						
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,691	745,873	12.37	600,476	7,948	3,386,408	592,528
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	758,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.22	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	376,502	228,796,110	27.13	8,421	5,843,085	30.98	5,344	2,859,246	23.89	390,267	7,711	5,331,954	382,556
1947	691,087	306,951,814	19.83	17,542	9,787,722	24.91	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	18,288,223	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,808	225,343,624	15.95	29,743	14,968,650	22.47	....	.....	....	660,551	6,253	2,746,109	654,298
1950	747,109	416,222,598	24.87	54,401	41,764,486	34.27	739	254,331	15.37	802,249	8,640	6,832,821	793,609
1951	677,874	727,343,348	47.90	54,963	80,178,309	65.12	1,619	1,258,941	34.71	734,456	2,603	3,947,740	731,853
1951:													
Feb.	49,217	55,013,580	49.90	5,347	8,314,086	64.91	123	119,086	43.27	54,687	552	790,245	54,135
Mar.	55,574	63,104,361	56.92	7,379	11,140,554	67.40	100	100,048	44.61	62,553	322	449,703	62,231
Apr.	48,931	55,238,582	50.31	5,850	9,604,002	73.29	182	183,311	44.93	54,963	3	3,942	54,960
May	37,737	44,187,969	52.27	4,534	7,584,613	74.67	99	80,285	36.16	42,370	7	11,132	42,363
June	51,811	61,809,219	53.26	4,692	7,475,970	71.13	120	84,110	30.14	56,623	224	423,689	56,399
July	67,511	78,807,699	52.11	5,619	8,522,995	67.71	154	99,482	28.82	73,284	....	.....	73,284
Aug.	66,217	70,536,735	47.55	4,529	5,805,789	57.23	148	93,807	28.31	70,894	159	290,479	70,735
Sept.	59,309	57,619,906	43.44	1,800	1,838,512	45.59	121	78,427	29.00	61,230	89	45,061	61,141
Oct.	51,850	49,109,610	42.28	3,055	3,499,763	51.15	206	149,590	32.42	55,111	73	120,779	55,038
Nov.	54,561	51,161,914	41.79	2,620	3,251,833	55.42	107	75,370	32.19	57,278	67	96,521	57,211
Dec.	44,332	42,695,894	42.99	860	1,190,609	61.82	171	110,448	28.79	45,363	25	22,732	45,338
1952:													
Jan.	80,561	76,995,564	42.67	2,569	3,299,142	39.95	153	97,922	28.60	83,283	140	207,976	83,143
Feb.	73,781	70,275,631	42.82	2,556	3,016,023	52.66	45	29,061	28.58	76,382	95	120,410	76,287
Mar.	81,577	76,567,896	41.90	3,570	4,149,537	51.88	25	12,701	22.68	85,172	93	127,007	85,079

Source: Bureau of the Census, U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under a separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1951:				
Mar.	62,904	35,335	332	76,312
Apr.	54,781	39,508	185	71,679
May	42,271	42,445	151	68,498
June	56,504	39,998	224	68,369
July	73,180	35,478	....	67,816
Aug.	77,338	36,506	158	67,491
Sept.	61,409	36,887	27	56,941
Oct.	55,219	37,407	73	63,501
Nov.	57,108	35,037	67	63,689
Dec.	45,193	33,256	25	76,569
1952:				
Jan.	83,130	36,776	140	75,123
Feb.	76,338	34,642	95	73,599
Mar.	85,147	35,489	93	61,263
Apr.	82,919	37,634	85	59,272
May	59,163	36,434	89	64,076

Source: Rubber Division, NPA, U. S. Department of Commerce.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	....	36	21,970
1946	2,294	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1951:						
Jan.	242	200,534	184	227,244	108	118,988
Feb.	86	76,034	128	214,303	12	11,014
Mar.	30	22,838	192	222,934	33	65,143
Apr.	364	241,725	86	180,518	43	39,402
May	306	200,459	130	194,904	26	22,515
June	227	153,222	151	250,828	72	63,998
July	115	94,073	193	308,222	23	32,106
Aug.	121	136,723	142	224,194	8	7,060
Sept.	307	227,392	62	105,395	12	14,660
Oct.	368	383,056	138	241,246	5	6,175
Nov.	148	123,442	167	270,242	33	26,011
Dec.	96	113,773	52	99,761	8	23,467
1952:						
Jan.	126	95,203	204	375,802	27	59,439
Feb.	31	23,118	15	211,229	10	33,474
Mar.	50	43,207	128	217,096	27	43,861

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	414,381	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1951	845,155	10,085	758,897	9,249	129,420
1952:					
Jan.	75,214	1,280	69,430	1,803	137,785
Feb.	73,087	1,058	65,667	2,128	144,281
Mar.	78,166	1,489	68,744	3,488	150,084
Apr.	76,457	1,320	67,592	2,404	158,622
May	60,545	1,593	66,891	2,946	153,754

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,525	58,907	76,475	15,333	855,240

Consumption

1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897

Exports

1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249

Stocks at End of Period

1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,289	129,420

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	52,008	51,746	57,057	61,308	63,125	66,981	80,554	86,863
Feb.	48,856	47,654	50,551	56,487	57,980	63,274	72,717	82,043
Mar.	55,364	56,703	59,947	68,171	73,282	78,780	86,486	87,065
Apr.	59,024	62,111	64,140	72,183	75,318	80,350	87,430	98,653
May	60,748	66,800	70,865	77,186	81,665	89,035	100,188	.....
June	60,580	63,247	71,329	78,044	83,374	90,174	96,093	.....
July	66,170	60,076	73,441	81,428	82,129	91,677	100,476	.....
Aug.	70,058	66,729	72,089	80,351	84,707	94,507	101,206	.....
Sept.	64,529	62,268	71,384	76,159	80,832	86,725	91,803	.....
Oct.	55,708	66,637	73,277	75,164	79,327	89,067	99,945	.....
Nov.	53,543	61,345	64,158	72,560	76,346	82,688	88,702	.....
Dec.	49,745	61,101	67,506	72,162	75,628	81,032	84,394	.....
Total	696,333	735,417	795,015	871,270	913,713	994,290	1,090,354	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption—Tons	Consumption—% to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,936	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,363
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	28.5	14,722	45,082
1951:					
Nov.	25,513	24,509	24.4	984	44,049
Dec.	23,692	22,044	24.8	1,024	45,082
1952:					
Jan.	27,855	26,553	24.9	958	45,067
Feb.	23,953	24,518	24.4	841	43,306
Mar.	22,833	24,797	23.8	1,054	40,579
Apr.	24,034	23,911	23.0	1,070	39,767
May	23,175	22,371	21.5	1,062	41,325

Source: U. S. Department of Commerce.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1932	1,135,491	235,187	1,370,678	1942	220,814	133,083	353,897
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1951:							
Jan.	478,589	127,583	606,172	July	381,407	110,244	481,651
Feb.	505,865	111,935	617,800	Aug.	426,932	121,993	548,925
Mar.	617,399	136,794	754,193	Sept.	365,906	109,353	475,259
Apr.	503,039	135,415	638,453	Oct.	414,533	110,740	525,273
May	511,938	140,047	651,985	Nov.	356,788	93,179	449,967
June	482,029	134,818	616,847	Dec.	293,305	17,481	310,786
1952:							
Jan.	273,572	101,060	374,632	July	.....	.....	.....
Feb.	333,885	100,706	434,591	Aug.	.....	.....	.....
Mar.	373,231	109,173	482,404	Sept.	.....	.....	.....
Apr.	416,155	112,833	528,988	Oct.	.....	.....	.....
May	397,836	105,586	503,422	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

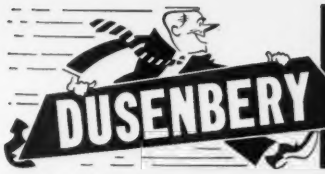
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1947	1948	1949	1950	1951
Passenger Car	21,346,004	23,842,796	27,715,344	35,096,404	29,146,048
Truck & Bus	7,737,353	6,920,231	4,238,174	6,625,129	6,877,419
Agricultural	2,633,699	3,140,882	2,695,430	2,853,483	3,019,581
Earth Mover	10,610	13,330	9,895	15,602	28,026
Total	31,727,666	33,917,239	34,658,843	44,590,618	39,071,074

	1951	1952			
	Dec.	Jan.	Feb.	Mar.	Apr.	May
Passenger Car	1,486,987	1,919,500	1,851,197	1,967,057	2,375,344	2,176,901
Truck & Bus	564,243	605,079	453,336	573,344	533,865	637,083
Agricultural	224,498	227,999	232,666	224,208	188,335	253,732
Earth Mover	3,851	5,077	4,121	7,468	2,495	456
Total	2,279,579	2,757,655	2,541,320	2,772,077	3,120,039	3,068,172

Source: The Tire & Rim Association, Inc.



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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car	21,589	41,295	656	63,540	66,738	8,273
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	**31,584**	**43,466**	**1,467**	**76,517**	**76,369**	**10,638**
Passenger Car	**28,129**	**36,440**	**509**	**65,077**	**65,140**	**8,904**
Truck and Bus	**3,456**	**7,026**	**958**	**11,440**	**11,228**	**1,734**
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952:						
Feb. (total)	2,301	3,721	163	6,184	7,463	11,370
Passenger Car	1,806	3,062	53	4,921	5,991	9,180
Truck and Bus	495	659	110	1,264	1,472	2,190
Mar. (total)	2,484	3,512	137	6,134	7,786	13,043
Passenger Car	1,998	2,952	48	4,997	6,344	10,558
Truck and Bus	486	560	89	1,136	1,442	2,485
Apr. (total)	2,814	4,038	115	6,967	7,189	13,295
Passenger Car	2,314	3,466	46	5,826	5,827	10,585
Truck and Bus	499	572	69	1,140	1,363	2,711

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton: Tire Cord Not Woven	Cotton: Cord Fabric Woven	Cotton: Chafer and All Other Tire Fabrics	Cotton: Total	Rayon and Nylon[b]: Tire Cord Not Woven	Rayon and Nylon[b]: Tire Cord And Other Tire Fabrics	Rayon and Nylon[b]: Total
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	*a*	60,569	60,569
Apr.-June	15,585	43,385	18,213	79,183	*a*	59,759	59,759
July-Sept.	29,743	45,927	*c*	75,670	*a*	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	*a*	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	*d*	33,213	25,395	56,608	*a*	68,296	68,926
Apr.-June	5,309	29,114	13,617	48,040	*a*	68,269	68,269
July-Sept.	1,343	16,620	11,141	29,104	15,640	55,969	71,609
Oct.-Dec.	180	17,650	11,886	29,716	12,967	58,890	72,857
Total	6,832	96,597	62,039	163,468	28,607	251,424	281,661
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,405	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476
1951:							
Jan.-Mar.	10,929	38,223	16,737	65,889	12,715	65,275	77,990
Apr.-June	12,608	42,491	17,055	72,154	11,979	61,957	73,936
July-Sept.	16,774	44,340	17,433	78,547	12,091	67,982	80,073
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1940	22.172	29.070	972	52.214	52.237	7,017
1941	24,722	33,749	1,232	59.703	57,433	4,686
1942	6.895	7,213	159	14,267	12,685	6,206
1943	6.350	12,474	189	19.014	15.014	2,626
1944	6,460	20.569	196	27.224	27.488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25.046	46.560	2,483	74,088	79,181	8,059
1948	26,833	40.548	1,119	68,499	70.033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41.240	42,671	811	84,723	80,179	.....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952:						
Jan.	2,144	3,232	99	5,475	5,582	10,343
Feb.	2,289	2,551	119	4,958	5,138	10,507
Mar.	2,484	2,458	92	5,034	5,497	10,900
Apr.	2,813	2,410	83	5,305	5,481	11,013

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1931	8¾	4⅛	6.17
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2⅞	5.96
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10⅝	12.37
1915	79	58½	65.85	1936	23	13⅛	16.41
1916	102	55	72.50	1937	26⅜	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅛	13⅛	17.50	1943	22½	22½	22.50
1923	37¼	24¾	29.45	1944	22½	22½	22.50
1924	40½	17¾	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41⅜	33	37.72	1948	25	18	21.99
1928	41⅛	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16¼	7⅛	11.98	1951	76	52	*(a)*

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1945	1946	1947	1948	1949	1950	1951	1952
Jan.	22.36	25.49	32.58	36.09	33.37	31.89	45.04	42.96
Feb.	22.29	26.57	33.91	33.63	33.41	32.79	(a)	41.64
Mar.	22.43	27.52	35.89	35.04	33.44	32.65	46.06	41.70
Apr.	21.88	28.40	35.89	38.10	33.84	33.23	46.06	41.79
May	23.30	28.17	36.51	38.57	33.73	33.64	46.06	39.68
June	23.42	29.89	37.83	38.12	33.56	34.61	46.06	41.31
July	23.27	34.11	38.03	34.89	32.99	38.11	41.21	.....
Aug.	23.10	36.31	34.83	32.23	32.06	38.93	35.93	.....
Sept.	23.25	37.59	32.21	31.92	30.94	41.62	36.20	.....
Oct.	23.85	36.79	32.39	32.01	30.32	40.66	38.13	.....
Nov.	24.71	31.50	34.50	32.15	30.52	43.11	42.70	.....
Dec.	25.21	33.03	36.74	32.90	31.08	43.37	43.32	.....
Average for Year	23.25	31.28	35.11	34.64	32.44	37.05	42.43	.....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film[a]	Textile and Paper Coating Resins	Molding and Extrusion Materials	All Other
1948	98,021	31,085	73,598	21,147
1949	157,544	29,470	81,842	19,792
1950	227,149	46,044	113,889	21,868
1951	161,547	43,688	134,890	23,934
1952:				
Jan.	13,125	3,031	11,772	2,276
Feb.	12,734	3,327	11,190	1,772
Mar.	14,016	3,368	12,770	2,390
Apr.	12,484	3,490	11,993	1,963

Source: U. S. Tariff Commission.

Note: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting. Beginning January, 1951, statistics are listed on a resin content basis.

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Rubber Industry Employment, Wages and Hours

All Rubber Products

	1951				1952			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	222	$66.78	40.4	$1.653	218	$74.19	40.9	$1.814
Feb.	222	63.37	38.9	1.629	215	73.71	40.7	1.811
Mar.	220	65.88	40.0	1.647	216	73.81	40.8	1.809
Apr.	219	65.96	40.0	1.649	216	....	....	....
May	220	68.56	41.3	1.660	....	....	....	....
June	220	71.27	41.9	1.701	....	....	....	....
July	217	70.81	41.0	1.727	....	....	....	....
Aug.	218	69.52	40.7	1.708	....	....	....	....
Sept.	218	70.18	40.9	1.716	....	....	....	....
Oct.	215	68.67	40.3	1.704	....	....	....	....
Nov.	219	69.46	40.5	1.715	....	....	....	....
Dec.	219	73.91	41.2	1.794	....	....	....	....

Tires and Tubes

Jan.	91.3	73.69	38.4	1.919	94.4	86.99	40.9	2.127
Feb.	90.6	66.95	35.5	1.886	94.1	86.12	40.7	2.116
Mar.	88.3	71.40	37.6	1.899	93.8	86.09	40.9	2.105
Apr.	87.4	70.15	37.0	1.896	....	....	....	....
May	88.3	75.92	39.4	1.927	....	....	....	....
June	89.9	82.44	41.7	1.977	....	....	....	....
July	90.0	83.67	41.4	2.021	....	....	....	....
Aug.	91.5	82.07	41.2	1.992	....	....	....	....
Sept.	92.4	81.64	40.9	1.996	....	....	....	....
Oct.	89.8	78.76	39.9	1.974	....	....	....	....
Nov.	94.8	80.27	40.5	1.982	....	....	....	....
Dec.	95.4	86.26	41.0	2.104	....	....	....	....

Rubber Footwear

Jan.	24.9	57.53	41.6	1.383	25.4	60.27	40.1	1.503
Feb.	25.3	55.87	40.6	1.376	24.7	60.46	39.8	1.519
Mar.	25.0	58.17	41.4	1.405	24.2	61.51	40.2	1.530
Apr.	24.8	59.82	42.1	1.421	....	....	....	....
May	25.4	61.48	42.9	1.433	....	....	....	....
June	25.7	59.98	42.3	1.418	....	....	....	....
July	24.8	54.68	39.0	1.402	....	....	....	....
Aug.	25.2	57.04	40.8	1.398	....	....	....	....
Sept.	25.3	55.94	40.1	1.395	....	....	....	....
Oct.	25.5	56.76	40.0	1.404	....	....	....	....
Nov.	25.6	56.64	40.2	1.409	....	....	....	....
Dec.	25.5	59.95	40.7	1.473	....	....	....	....

All Other Rubber Products

Jan.	105.8	63.06	41.9	1.505	97.9	65.63	41.2	1.593
Feb.	106.3	61.95	41.3	1.500	96.1	64.91	40.9	1.587
Mar.	106.3	63.13	41.7	1.514	97.6	64.95	40.8	1.592
Apr.	106.3	63.81	41.9	1.523	....	....	....	....
May	106.0	64.09	42.5	1.508	....	....	....	....
June	104.7	64.47	42.0	1.535	....	....	....	....
July	102.2	63.29	41.1	1.540	....	....	....	....
Aug.	101.2	61.42	40.3	1.524	....	....	....	....
Sept.	100.2	63.06	41.0	1.538	....	....	....	....
Oct.	99.4	62.68	40.7	1.540	....	....	....	....
Nov.	98.2	62.36	40.6	1.536	..	....	....	....
Dec.	97.9	65.45	41.5	1.577	....	....	....	....

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by Federal Security Agency data for 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earning data pertain only to production and related workers.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1950	1951	1952		1950	1951	1952
Jan.	194	244	248	July	222	243	....
Feb.	195	235	243	Aug.	236	243	....
Mar.	197	239	245	Sept.	244	245	....
Apr.	203	238	239	Oct.	250	239	....
May	213	247	....	Nov.	250	245	....
June	221	251	....	Dec.	251	250	....

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	265	454	468	July	454	438	....
Feb.	273	434	442	Aug.	457	467	....
Mar.	293	459	407	Sept.	404	435	....
Apr.	288	439	....	Oct.	405	445	....
May	321	432	....	Nov.	397	438	....
June	350	433	....	Dec.	424	363	....

Source: U. S. Department of Commerce.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1950	1951	1952		1950	1951	1952
Jan.	524	562	797	July	501	616	....
Feb.	526	555	805	Aug.	483	640	....
Mar.	532	554	820	Sept.	502	659	....
Apr.	536	565	....	Oct.	524	705	....
May	540	583	....	Nov.	564	739	....
June	544	610	....	Dec.	549	799	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1945	1946	1947	1948	1949	1950	1951
Antimony, Primary:							
Short tons	.....	.....	39	41	55	.....	.....
% of total	.....	.....	.002	.003	.005	.....	.....
Asphalt: [a]							
Short tons	19,483	28,715	32,113	19,967	18,050	26,819	.....
% of total	.005	.007	.007	.004	.003	.003	....
Barite (Barytes):							
Short tons	10,000	20,000	17,000	18,000	14,000	.....	.....
% of total	2.1	4.4	3.1	2.85	2.53	.....	.....
Carbon Black:							
Short tons	402,193	470,732	471,790	435,282	383,565	515,184	530,614
% of total	95.5	95.3	94.3	95.5	93.3	92.9	92.9
Clay, Kaolin:							
Short tons	109,936	162,393	166,201	176,965	197,341	263,306	.....
% of total	11.7	12.3	11.5	11.3	13.1	15.0	.....
Clay, Fire & Stoneware:							
Short tons	7,800	12,951	17,970	15,480	.....	.....	.....
% of total	0.1	0.2	0.2	0.2	.....	.....	.....
Lime:							
Short tons	7,170	3,193	589	1,154	715	908	.....
% of total	0.12	0.05	0.01	0.02	.0002	.0002	.....
Litharge:							
Short tons	1,864	2,131	2,205	2,835	.....	.....	.....
% of total	1.3	1.6	1.3	1.8	.....	.....	.....
Lithopone:							
Short tons	977	1,607	3,085	4,192	3,245	.....	.....
% of total	0.7	1.1	1.9	3.0	4.1	.....	.....
Mica, Ground:							
Short tons	3,715	4,951	3,900	4,372	3,856	.....	.....
% of total	7.1	8.0	6.0	7.0	7.0	.....	.....
Sulfur:							
Short tons	64,960	72,800	72,800	70,560	59,360	.....	.....
% of total	2.0	2.2	1.8	1.7	1.5	.....	.....
Talc: [b]							
Short tons	63,758*	65,980	71,840	66,226	53,414	.....	.....
% of total	16.0	14.4	13.9	13.0	.12	.....	.....
Zinc Oxide:							
Short tons	63,447	83,776	82,248	82,895	58,496	82,944	.....
% of total	49.6	53.1	51.2	54.9	52.5	51.6	.....

Source: U. S. Bureau of Mines.

Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. * Revised.

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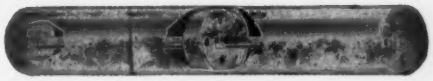

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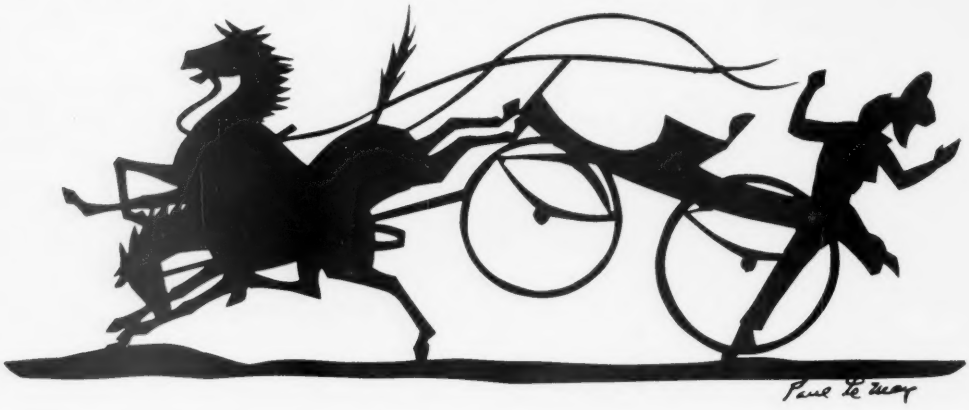

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